TEST SERIES FOR GATE

BOOKLET SERIES A

Paper Code: PH

Test Type: TEST SERIES

Duration: 3:00 Hours

PHYSICS

Date: 09-01-2016

Maximum Marks: 100

Read the following instructions carefully:

1. Attempt all the questions.
2. This question paper consists of **2 sections**, General Aptitude (GA) for **15 marks** and the subject specific GATE paper for **85 marks**. Both these sections are compulsory. The GA section consists of **10** questions. Question numbers 1 to 5 are of 1-mark each, while question numbers 6 to 10 are of 2-mark each. The subject specific GATE paper section consists of **55** questions, out of which question numbers 11 to 35 are of 1-mark each, while question numbers 36 to 65 are of 2-mark each.
3. The question paper may consist of questions of **multiple choice type** (MCQ) and **numerical answer type**.
4. Multiple choice type questions will have four choices against (a), (b), (c), (d), out of which only **ONE** is the correct answer.
5. For numerical answer type questions, each question will have a numerical answer and there will not be any choices.
6. All questions that are not attempted will result in zero marks. However, wrong answers for multiple choice type questions (MCQ) will result in **NEGATIVE** marks. For all MCQ questions a wrong answer will result in deduction of ⅓ marks for a **1-mark** question and ⅔ marks for a **2-mark** question.
7. There is **NO NEGATIVE MARKING** for questions of **NUMERICAL ANSWER TYPE**.
8. Non-programmable type Calculator is allowed.

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Q.1-Q. 5 carry ONE mark each.

1. Which of the following options is closest in meaning to the word given below?
FAD :
(a) Apathetic (b) Expensive (c) Vogue (d) Benevolent

2. The difference between the squares of two consecutive odd integers is always divisible by which of the following numbers.
(a) 6 (b) 8 (c) 12 (d) 16

3. Which one of the following options is the closest in meaning to the word given below?
Cantankerous
(a) Freedom (b) meticulous (c) bad tempered (d) coercion

4. If *a* and *b* are real numbers and $a > b$, then which of the following is true always

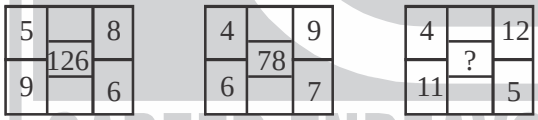
(a) $|a| > |b|$ (b) $a^2 > b^2$ (c) $a(a+1) > b(b+1)$ (d) $2b-1 < 2a-1$

5. Given below is a pair of words. Choose the most appropriate and related alternative from the options given below:
MENDACIOUS: TRUTHFUL
(a) Gelid: Icy (b) Scorching: Hot
(c) Cognisance: Recognition (d) Capricious: Constant

Q.6-Q. 10 carry TWO marks each.

6. Given below is a pair of words. Choose the most appropriate and related alternative from the options given below:
MENDACIOUS: TRUTHFUL
(a) Gelid: Icy (b) Scorching: Hot
(c) Cognisance: Recognition (d) Capricious: Constant

7. What will come in place of ? mark?



(a) 240 (b) 336 (c) 180 (d) none of these

8. The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair:
Exercise: Strong
(a) Perform: Timid (b) Guard: Alert (c) Decide: Shrewd (d) Read: Knowledgeable

9. What is the remainder when $2^{11}(2^{10} + 1)$ is divided by 15

(a) 2 (b) 3 (c) 5 (d) 10

10. Karan and Arjun run a 100 metre race, where Karan beats Arjun by 10 metres. To do a favour to Arjun, Karan starts 10 metres behind the starting line in a second 100 metre race. They both run at their earlier speeds which of the following is true in connection with the second race?
(a) Karan and Arjun reach the finishing line simultaneously
(b) Arjun beats Karan by 1 metre.
(c) Arjun beats Karan by 11 metre.
(d) Karan beats Arjun by 1 metre.

Q.11-Q.35 carry one mark each.

11. The laplace transformation of $e^{-t}\sin^2 t$ is :

(a) $\frac{2}{(s+1)(s^2+2s+5)}$ (b) $\frac{4}{(s+1)(s^2+2s+5)}$ (c) $\frac{2}{(s^2+2s+5)}$ (d) $\frac{4}{(s^2+2s+5)}$

12. Four point charges are placed in a plane at following positions $+Q(1,0), -Q(-1,0), +Q(0,1)$ and $-Q(0,-1)$. At large distances, the electrostatic potential due to this charge distribution will be dominated by

(a) Monopole moment (b) Dipole moment
(c) Quadrapole moment (d) Octapolemoment.

13. An electron (mass = 9×10^{-31} kg, charge = 1.6×10^{-19} C) moving with a velocity 10^6 m/s, enters a magnetic field. If it describes a circle of radius 0.1 m, then strength of the magnetic field is equal to

(a) 4.5×10^{-5}T (b) 1.4×10^{-5}T (c) 5.6×10^{-5}T (d) 2.6×10^{-5}T

14. The critical magnetic field for a solid in superconducting state

(a) Does not depend upon temperature (b) Increases if the temperature increases
(c) Increases if the temperature decreases (d) Decreases if the temperature decreases.

15. The number of transitions possible from $^3D_2$ state to $^3P_1$ state in presence of weak magnetic field is

(a) 7 (b) 8 (c) 9 (d) 10

16. If the isothermal compressibility of a solid is given by $K_T = 10^{-8}(\text{Pa})^{-1}$, the pressure required to increase its density by 1% is approximately equal to

(a) 10^4 Pa (b) 10^6 Pa (c) 10^8 Pa (d) 10^{10} Pa

17. State of a particle in a infinite potential well is given to be $\psi(x) = A\sin\left(\frac{2\pi x}{L}\right)\cos\left(\frac{\pi x}{L}\right)$ where $0 \le x \le L$

Which of the following values will the energy measurement give?

(a) $\frac{\pi^2\hbar^2}{2mL^2}, \frac{9\pi^2\hbar^2}{2mL^2}$ (b) $\frac{2\pi^2\hbar^2}{mL^2}, \frac{9\pi^2\hbar^2}{2mL^2}$ (c) $\frac{\pi^2\hbar^2}{mL^2}, \frac{2\pi^2\hbar^2}{mL^2}$ (d) $\frac{8\pi^2\hbar^2}{mL^2}, \frac{2\pi^2\hbar^2}{mL^2}$

18. The locus represented by $|z-3|+|z+3|=10$ (z is complex number in argand plane) is equal to

(a) ellipse (b) circle (c) parabola (d) straight line

19. Lagrange's equations do not change if we add total time derivative of a function 'F' with Lagrangian. The function F is a function of

(a) q_j, & t only; $F = F(q_j, t)$ (b) $q_j, \dot{q}$, & t; $F = F(q_j, \dot{q}, t)$
(c) $\dot{q}$, & t only; $F = F(\dot{q}, t)$ (d) t only; $F=F(t)$

20. The interaction energy of two particles in the field of each other is given by $U(r) = -\frac{a}{r} + \frac{b}{r^9}$. Where a & b are constants. Then:

(a) the representation between the particles to form stable compound is $\left(\frac{9b}{a}\right)^8$.

(b) the potential energy of the two particles in stable configuration is $-\frac{9}{8}\frac{a}{r_o}$

(c) in the stable configuration the energy of attraction is 9 times the energy of replusion

(d) in the stable configuration energy of replusion is 9 times the energy of attraction.

21. A free neutron decays to a proton but a free proton does not decay to a neutron. This is because:

(a) neutron is a composite particle made of a proton and an electron wheras proton is a fundamental particle.
(b) neutron is an uncharged particle whereas proton is a charged particle
(c) neutron has large rest mass than the proton
(d) weak forces can operate in a neutron but not in a proton.

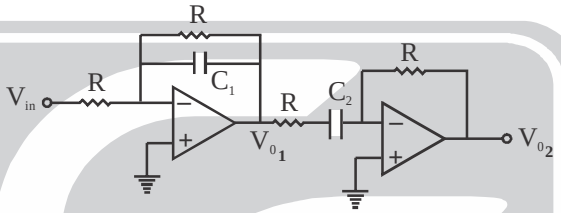
22. Which of the following transition in sodium is not allowed by dipole selection rule.

(a) ${}_4S_{1/2} \rightarrow {}_3P_{3/2}$ (b) ${}_4P_{3/2} \rightarrow {}_3S_{1/2}$ (c) ${}_4D_{5/2} \rightarrow {}_3P_{1/2}$ (d) ${}_4D_{3/2} \rightarrow {}_3P_{1/2}$

23. For an ideal B –E gas of N Bosons (where = $\frac{N}{V}$) the condensation temperature is:

(a) proportional to $n^{5/3}$ (b) proportional to $n^{2/3}$
(c) proportional to n (d) independent of n

24. Identify the circuit shown in figure.



(a) HIgh pass filter (b) Low pass filter (c) Band pass filter (d) Band reject filter.

25. If matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ can be diagonalised to B by similarity transfroamtion $B = P^{-1}AP$. The trace of B^3 is equal to

(a) 7 (b) 21 (c) 73 (d) None of these

26. The value of $\nabla^2\left(r^n\right)$ can be simplified to (where $\vec{r}$ is position vector of the point (x, y, z) w.r.t. origin and ∇^2 is the Laplacian operator)

(a) $n(n-1)r^{n-2}$ (b) $n(n+1)r^{n-2}$ (c) $n(n+2)r^{n-2}$ (d) None of these

27. In a cloud of electrons having 5×10^{28} electrons per m^3, 80 % of the electrons drift along x-axis with a velocity 0.02 m/s and 20% of the electrons drift along y-axis with same speed. The current density is equal to

(a) $-3.2\times10^7\left(4\hat{i}+\hat{j}\right)A.m^{-2}$ (b) $3.2\times10^7\left(4\hat{i}+\hat{j}\right)A.m^{-2}$

(c) $3.2\times10^7\left(\hat{i}+4\hat{j}\right)A.m^{-2}$ (d) $-3.2\times10^7\left(\hat{i}+4\hat{j}\right)A.m^{-2}$

28. A particle of mass m moves in a three –dimensional harmonic oscillator well. The Hamiltonian is $H=\frac{p^2}{2m}+\frac{1}{2}k\mathbf{r}^2$. If eight identical non-interacting (spin –1/2) particles are placed in such a harmonic potential ,the ground state energy for the eight –particle system is

(a) $18\hbar\omega$ (b) $16\hbar\omega$ (c) $24\hbar\omega$ (d) $12\hbar\omega$

29. Let any operator $\hat{M} = i\left(\hat{x}^2 + 1\right)\frac{d}{dx} + i\hat{x}$ satisfies the equation $\hat{M}\psi(x) = 0$. Then the normalized eigenfunction is:

(a) $\frac{1}{\sqrt{\pi\left(x^2+1\right)}}$ (b) $\frac{1}{\pi\sqrt{\left(x^2+1\right)}}$ (c) $\frac{1}{\sqrt{\pi}\left(x^2+1\right)}$ (d) $\frac{1}{\pi\left(x^2+1\right)}$

30. If the total energy of a particle of mass 'm' is equal to twice its rest energy, then the magnitude of the particles relativistic momentum is

(a) mc/2 (b) $mc/\sqrt{2}$ (c) mc (d) $\sqrt{3}mc$

31. $$\begin{pmatrix} a'_x \\ a'_y \\ a'_z \end{pmatrix} = \begin{bmatrix} 1/2 & \sqrt{3}/2 & 0 \\ -\sqrt{3}/2 & 1/2 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} a_x \\ a_y \\ a_z \end{pmatrix}$$

The matrix shown above transforms the components of a vector in one coordinate frame 'S' to the components of the same vector in a second coordinate frame S'. This matrix represents a rotation of the reference frame S by

(a) 30° clockwise about the x-axis (b) 60° clockwise about the y-axis.
(c) 45° clockwise about the z-axis. (d) 60° counterclockwise about the z-axis

32. Consider a system of two atoms ,each having only 3 quantum states of energies $0, \in$ and $2\in$. The system is in contact with a heat reservoir at temperature T. The partition function of the system if the particles obey Fermi-Diarc statistics ,is

(a) $1 + \exp(-\beta\in) + \exp(-2\beta\in)$

(b) $\left(1 + \exp(-\beta\in) + \exp(-2\beta\in)\right)^2$

(c) $\exp(-\beta\in) + \exp(-2\beta\in) + \exp(-3\beta\in)$

(d) $1 + \exp(-\beta\in) + 2\exp(-2\beta\in) + 2\exp(-3\beta\in) + \exp(-4\beta\in)$

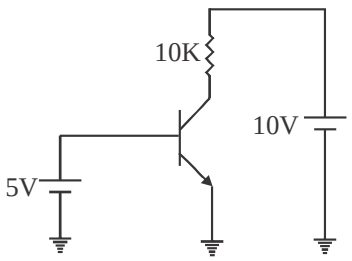
33. An alpha particle of energy 5 MeV is scattered through 180° by a fixed uranium nucleous. The distance of closest approach is equal to

(a) 5.3×10^{-12} m (b) 3.7×10^{-12} m (c) 5.3×10^{-14} m (d) 3.7×10^{-14} m

34. The angular momentum and parity for the ground statee of $^{33}_{16}S$ nucleous is equal to

(a) $\frac{1}{2}$, even (b) $\frac{1}{2}$, odd (c) $\frac{3}{2}$, odd (d) $\frac{3}{2}$, even

35. For the given transistor amplifier $h_{fe} = 100$, $h_{ie} = 10k$



The current gain and input impedance are

(a) 100, 10k (b) –100, 10k (c) 10, 10k (d) 1000, 10 k

Q.36-Q.65 carry TWO marks each.

36. The value of the contour integral $\oint_C \frac{z-3}{z^2+2z+5}\,dz$, where $C: |z+1-i| = 2$ is of the form $a + bi$. The value of a/b is _____

37. The energy $E(\vec{K})$ of electrons of wave vector $\vec{K}$, in a solid is given by $E(\vec{K}) = AK^2 + BK^4$ (where A and B are constants). The effective mass of electron at $|\vec{K}| = K_0$ is equal to

(a) $AK_0^2 + B$ (b) $\frac{\hbar^2}{2AK_0^2}$ (c) $\frac{\hbar^2}{2A+12BK_0^2}$ (d) $\frac{\hbar^2}{2AK_0^2+12B}$

38. The $J = 0 \rightarrow J = 1$ rotational absorption line occurs at 1.153×10^{11} cycles / sec in ${}^{n}C^{16}O$ and at 1.102×10^{11} cycles / sec in ${}^{12}C^{16}O$. The mass number of unknown carbon isotope is equal to _____

39. The Lande-g factor for ${}^3P_1$ level of an atom is equal to _____

40. A monocrystalline solid comprise of 2N atoms, out of which p atoms are in interstitial positions. If the available interstitial sites are R, then the number of possible microstates are

(a) $\frac{(R+p)!}{p!(2N)!}$ (b) $\frac{(2N)!}{p!(2N-p)!}\cdot\frac{R!}{p!(R-p)!}$

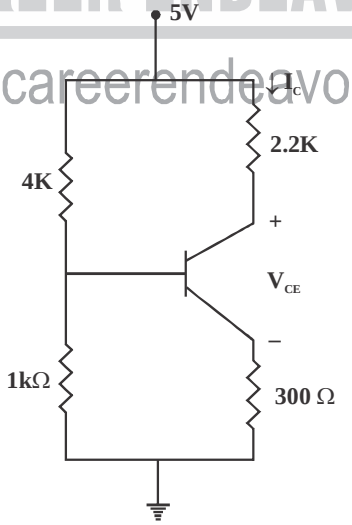
(c) $\frac{(2N)!}{R!(2N-R)!}\cdot\frac{p!}{R!(p-R)!}$ (d) $\frac{(2N)!}{p!(2N-p)!}$

41. A particle of mass 'm' is moving in a potential of the form $V(x,y,z) = \frac{1}{2}m\omega^2\left(3x^2+3y^2+2z^2+2xy\right)$. The oscillation frequencies of three normal modes of the particle are given by,

(a) ω, $\sqrt{3}\omega$ and $\sqrt{3}\omega$ (b) $\sqrt{2}\omega$, $\sqrt{3}\omega$ and $\sqrt{3}\omega$

(c) $\sqrt{2}\omega$, $\sqrt{2}\omega$ and 2ω (d) $\sqrt{2}\omega$, 2ω and 2ω

42. Assume β of transistor very large and $V_{BE} = 0.7v$. I_C and V_{CE} in the circuit are shown in figure.



(a) $I_C = 1\,mA$ $V_{CE} = 4.7V$ (b) $I_C = 0.5\,mA$ $V_{CE} = 3.75V$

(c) $I_C = 1\,mA$ $V_{CE} = 2.5V$ (d) $I_C = 0.5\,mA$ $V_{CE} = 3.9V$

43. A linear harmonic oscillator is in a state which is a super position of the ground state and first excited state. If the average energy of the oscillator is $1.4\hbar\omega$, then the corresponding normalized wavefunction of the oscillator is:

(a) $\left[\,|\varphi_0\rangle+|\varphi_1\rangle\right]$ (b) $\left[\frac{9}{10}|\phi_0\rangle+\frac{1}{10}|\phi_1\rangle\right]$

(c) $\left[\frac{3}{\sqrt{10}}|\phi_0\rangle+\frac{1}{\sqrt{10}}|\phi_1\rangle\right]$ (d) $\frac{1}{\sqrt{10}}\left[\,|\varphi_0\rangle+3|\varphi_1\rangle\right]$

44. Which option is correct?

(A) $\Lambda^0 \to \pi^+ + \pi^-$ (B) $\pi^- + p \to n + \pi^0$

(C) $\pi^+ + p \to \pi^+ + p + \pi^- + \pi^0$ (d) $\gamma + n \to \pi^- + p$

(a) A, B, C not allowed and D allowed. (b) A, B allowed and C, D not allowed

(c) A, B, C, D allowed (d) A , C not allowed and B, D allowed.

45. Consider three level Bosonic system with energies $\varepsilon_1 = 0, \varepsilon_2 = \varepsilon$ and $\varepsilon_3 = 2\varepsilon$. Partition function of the system of two Bosons is

(a) $\left(1+e^{-\varepsilon/kT}+e^{-2\varepsilon/kT}\right)^2$ (b) $\frac{\left(1+e^{-\varepsilon/kT}+e^{-2\varepsilon/kT}\right)^2}{2}$

(c) $\frac{\left(1+e^{-\varepsilon/kT}+e^{-2\varepsilon/kT}\right)^2}{24}$ (d) $\frac{\left(1+e^{-\varepsilon/kT}+e^{-2\varepsilon/kT}\right)^2}{6}$

46. For given Lagrangian $L = \frac{1}{2}m\left(\ell^2\dot{\theta}^2 + \ell^2\dot{\phi}^2\sin^2\theta\right) + mg\ell\cos\theta$. The conserved quantity is:

(a) $\frac{g}{\ell}\sin\theta$ (b) $\dot{\phi}\sin^2\theta$ (c) $\phi\sin^2\theta$ (d) $\phi^2\sin^2\theta$

47. The density of copper is 8.94×10^3 kg/m^3, and its atomic mass is 63.5 amu. If resistivity of the copper at 20ºC is: $\rho = 1.72\times10^{-8}\ \Omega - m$. What is relaxation time (τ) of electron? Each copper atom contributes one free electron to the metal.

(a) 2.5×10^{-16} sec. (b) 2.5×10^{-15} sec.

(c) 2.5×10^{-14} sec. (d) 2.5×10^{-13} sec.

48. The translational vectors of a space lattice are given:

$$\vec{P} = \frac{\hat{i}}{2} + \frac{\sqrt{3}}{2}\hat{j},\quad \vec{Q} = -\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j},\ \vec{R} = \hat{k}$$

The volume of the cell is equal to

(a) $\frac{2}{\sqrt{3}}$ (b) $\frac{\sqrt{3}}{2}$ (c) $2\sqrt{3}$ (d) $3\sqrt{2}$

49. A beam of light is a mixture of linearly polarized light and unpolarized light. When beam sent through a polaroid sheet. It is found that transmitted intensity can be varied through a factor of 5 depending upon the orientation of the polaroid. The ratio of the intensities of the polarized to unpolarized component in incident beam is

_____

50. Imagine earth to be symmetric top $(I_1 = I_2 < I_3)$ undergoing a torque free motion. If $\left(\frac{I_3 - I_1}{I_1}\right) = 0.00333$, the period of precession of the axis of rotation about the symmetry axis is _____ days.

51. The value of integral $\int_0^\infty x^{n-1} e^{-m^2x^2} dx$ is equal to

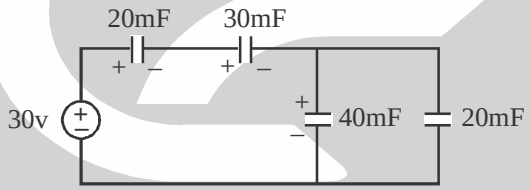
(a) $\frac{1}{2m^n}\Gamma\left(\frac{n}{2}\right)$ (b) $\frac{1}{2m^n}\Gamma\left(\frac{n}{2}-1\right)$ (c) $\frac{1}{2m^{n/2}}\Gamma\left(\frac{n}{2}\right)$ (d) $\frac{1}{2m^{n/2}}\Gamma\left(\frac{n}{2}-1\right)$

52. The value of the integral $\int_{-1}^{+1} P_n(x)\left(1-2xt+t^2\right)^{-1/2} dx$ can be simplified to [$P_n(x)$ is the legendre polynomial of order 'n']

(a) $\frac{2}{2n+1}$ (b) $\frac{2t^n}{2n+1}$ (c) $\frac{t^n}{2n+1}$ (d) None of these

53. A spin -1/2 particle is in a state described by the $A\begin{pmatrix}1+i\\2\end{pmatrix}$. Where A is normalization constant. The probability of finding the particle with spin projection $S_z = -\frac{\hbar}{2}$ is _____

54. The value of v_1, v_2 and v_3 respectively for the given circuit shown is



(a) 15v, 10v, 5 v (b) 5v, 10 v, 15 v (c) 5v, 15v, 10v (d) 10 v, 5v, 15v

55. The energy levels of hydrogen atom are given by

$$E_n = -\frac{z^2}{n^2}(\text{Rydberg})$$

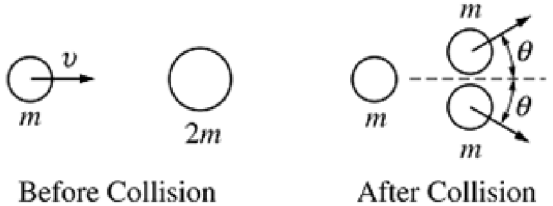
The excitation energy of n = 2 level to n = 1 level for He^+ is _____ eV.

56. Consider a toroidal coil of the N terns wound uniformly on a form of non-magnetic material with square cross section of side 'a'. If the mean radius of toroid is 'R' the total flux through the coil is equal to

(a) $\frac{\mu_0 N^2 aI}{2\pi}\ell n\left(\frac{R+a/2}{R-a/2}\right)$ (b) $\frac{\mu_0 N^2 aI}{2\pi}\ell n\left(\frac{R-a/2}{R+a/2}\right)$

(c) $\frac{\mu_0 N^2 aI}{2\pi}\ell n\ 2a$ (d) $\frac{\mu_0 N^2 aI}{2\pi}\ell n\ R$

57.



Before Collision After Collision

A particle of mass 'm' is moving along the x-axis with speed 'v' when it collides with a particle of mass '2m' initially at rest. After the collision, the first particle has come to rest, and the second particle has split into two equal-mass pieces that move at equal angle $\theta > 0$ with the x-axis, as shown in the figure above. Which of the following statements correctly describes the speeds of the two pieces?

(a) One of the pieces moves with speed 'v', the other moves with speed less than 'v'

(b) Each piece moves with speed v/2.

(c) One of the pieces moves with speed v/2, the other moves with speed greater than v/2.

(d) Each piece moves with speed greater than v/2.

58. A system consists of N very weakly interacting particles at a temperature sufficiently high such that classical statistics are applicable. Each particle has mass m and oscillates in one direction about its equilibrium position. The heat capacity at temperature T ,if restoring force is proportional to x^3.

(a) $\frac{3}{2}Nk$ (b) $\frac{5}{2}Nk$ (c) Nk (d) $\frac{3}{4}Nk$

59. The band gap in a BCS superconductor is measured to be 3 meV at 0K. The critical temperatuer (T_C) of the superconductor is _____ K.

60. A radioactive source emits both α and β – particles with 1600 years and 400 years as respective half life. The time after which one fourth of the material remains unchanged is equal to _____ years.

61. The energy of γ - rays emitted in the β - decay of $^{28}_{13}Al$ is equal to _____ MeV.

(Given: The end point energy is 2.81MeV, $M\left(^{28}_{13}Al\right) = 27.9819\ u$, $M\left(^{28}_{14}Si\right) = 27.9769\ u$)

62. For a 5 bit DAC (weighted resistor) maximum value of resistance used if the resistance of MSB is $1k\Omega$, will be _____ $k\Omega$.

63. A particle of mass m moves (non-relativistically) in three-dimensional potential

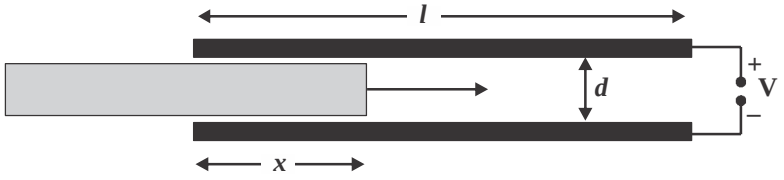
$$V = \frac{1}{2}k\left(x^2 + y^2 + z^2 + \lambda xy\right)$$

Where λ is a small parameter.

The ground state energy corrected to first order is

(a) $\frac{1}{2}\hbar\omega - \lambda$ (b) $\frac{3}{2}\hbar\omega - \lambda\hbar\omega$ (c) $\frac{3}{2}\hbar\omega$ (d) $\frac{1}{2}\hbar\omega$

64. Consider a parallel plate capacitor with plate separation 'd' and each plate having a length '*l*' and width 'a'(shown below). A dielectric slab of permittivity $\in$, thickness 'd', length '*l*' and width 'a' is partially inserted between the plates. If a constant potential difference 'V' is maintained between the plates and a length 'x' of the slab remains between the plates, then



The force exerted on the dielectric slab is equal to

(a) $\frac{a}{d}(\in - \in_0)V^2\hat{x}$ (b) $\frac{a}{2d}(\in - \in_0)V^2\hat{x}$ (c) $\frac{a}{2d}(\in - \in_0)xV^2\hat{x}$ (d) $\frac{a}{d}(\in - \in_0)xV^2\hat{x}$

65. Consider an E.M. wave with electric vector parallel to plane of incidence (that forms the boundary between two linear media) is incident obliquely then which statements is/are correct among the following:

1. Fresnal's equations are given by

$$E_{oR} = \left(\frac{\alpha - \beta}{\alpha + \beta}\right) E_{oI} \;\&\; E_{oT} = \left(\frac{2}{\alpha + \beta}\right) E_{oI}$$

2. The reflected wave is in phase it $\mu_1 = \mu_2$ & $n_1 > n_2$
3. The reflected wave is out of phase it $\mu_1 = \mu_2$ & $n_1 > n_2$
4. If wave incident on plane of incidence at Brewster angle, the reflected wave is completely polarized with vibration perpendicular to the plane of incidence.

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

Space for rough work

PHYSICS-PH

Date: 09-01-2016

GATE TEST SERIES-I

ANSWER SHEET

1. (c)	2. (b)	3. (c)	4. (d)	5. (d)	6. (d)	7. (b)
8. (d)	9. (d)	10. (d)				

11. (a)	12. (b)	13. (c)	14. (c)	15. (c)	16. (c)	17. (a)
18. (a)	19. (a)	20. (c)	21. (c)	22. (c)	23. (b)	24. (d)
25. (c)	26. (b)	27. (a)	28. (a)	29. (a)	30. (d)	31. (d)
32. (c)	33. (c)	34. (d)	35. (b)	36. (-2)	37. (c)	38. (11)
39. (1.5)	40. (b)	41. (c)	42. (c)	43. (d)	44. (d)	45. (b)
46. (b)	47. (c)	48. (b)	49. (1.5)	50. (300)	51. (a)	52. (b)
53. (0.66 to 0.68)		54. (a)	55. (40.8)	56. (a)	57. (d)	58. (d)
59. (10)	60. (640)	61. (1.8 to 1.9)		62. (16)	63. (c)	64. (b)
65. (b)						