RGUCET 22
Common Entrance Test, 2022
Ph.D. IN PHYSICS

1	High Level Language is..... .					
	a) Disk space dependent	b) O. S. dependent	c) Machine independent	d) Machine dependent	c)	Machine independent
2	An appropriate source to find out descriptive information is.....					
	a) Bibliography	b) Directory	c) Encyclopaedia	d) Dictionary	c)	Encyclopaedia
3	A theory:					
	a) Is an accumulated body of knowledge	b) Includes inconsequential ideas	c) Is independent of research methodology	d) Should be viewed uncritically	a)	Is an accumulated body of knowledge
4	Which of the following is the first step in starting the research process?					
	a) Searching sources of information to locate problem.	b) Survey of related literature	c) Identification of problem	d) Searching for solutions to the problem	c)	Identification of problem
5	Four persons *P*, *Q*, *R*, and *S* are to be seated in a row. *R* should not be seated at the second position from the left end of the row. The number of distinct seating arrangements possible is:					
	a) 6	b) 9	c) 18	d) 24	c)	18
6	The value of $\sum_{k=0}^{20} i^{2k}$, where $i^2=-1$ equals to					
	a) -1	b) 0	c) 1	d) i	c	1
7	If the sides of a square are increased by 5%, by what per cent, its area will be increased?					
	a) 10%	b) 10.25%	c) 12%	d) 12.25%	b	10.25%
8	If p=a sin x+b cos x and q=a cos x-b sin x, the value of p^2+q^2 is					
	a) a+b	b) ab	c) a^2+b^2	d) a^2-b^2	c	a^2+b^2
9	**Melt : Liquid :: Freeze :**					
	a)Ice	b) Solid	c)Condense	d)Push	b	Solid
10	The square of standard deviation is called					
	a)Standard error	b)Variance	c)Covariance	d)Correlation	b	Variance
11	Each β particle emitted from a nucleus is accompanied by a					
	a) Neutron	b)Proton	c) Electron	d) Neutrino	d	Neutrino

12	The measure of the strength of strong nuclear force holding the nucleus together is called					
	a) Potential energy	b) Kinetic energy	c) Nuclear energy	d) Binding energy	d	Binding energy
13	Find the correct exchange particles in the Yukawa module of strong force					
	a) Pions and other particles	b) Quarks	c) Photons	d) Baryons	a	Pions and other particles
14	Which one of the following is not a boson?					
	a)$_2He^4$	b)$_2He^3$	c) meson	d) Higgs particle	b	$_2He^3$
15	The electron rest mass is of the order of---					
	a) 10^{-31}gm	b) 10^{-35}gm	c) 10^{-28}gm	d) 10^{-25}gm	c	10^{-28}gm
16	The quadrupole moment of the nucleus is a					
	a) Tensor	b) Scalar	c) Vector	d) Finite magnitude	a	Tensor
17	Which of the following in not used as a moderator in a nuclear reactor?					
	a) H_2O	b) D_2O	c) C	d) Al	d	Al
18	A nucleus of medium mass with excess of neutrons may decay with the emission of					
	a) Neutron	b) Electron	c) Proton	d) Positron	b	Electron
19	Which are of the following disintegration series of the heavy elements will give ^{209}Bi as a stable nucleus?					
	a) Thorium series	b) Neptunium series	c) Uranium series	d) Actinium series	b	Neptunium series
20	The quarks are supposed to exist in following number of flavours---					
	a) Two	b) Four	c) Six	d) Sixteen	c	Six
21	The spectrum of sodium atom can be explained by considering					

	a) j-j coupling	b) Spin-orbit interaction	c) L-S coupling	d) None of these	b	Spin-orbit interaction
22	The wavelength obtained from Ruby Laser is					
	a)5890 $\overset{0}{A}$	b) 5896 $\overset{0}{A}$	c) 6328 $\overset{0}{A}$	d) 6943 $\overset{0}{A}$	d	6943 $\overset{0}{A}$
23	If the radius of the first orbit in hydrogen atom is 0.05 nm, the radius of the first orbit in helium atom is					
	a)0.025 nm	b) 0.05 nm	c) 1 nm	d) 2 nm	a	0.025 nm
24	The maximum number of electrons in a subshell with orbital quantum number *l* is					
	a)(2l+1)	b) (2l-1)	c) 2(2l+1)	d) 2(2l-1)	c	2(2l+1)
25	The average binding energy of a nucleon in a nucleus of an atom is					
	a)8 eV	b) 80 Ev	c) 8 MeV	d) 80 MeV	c	8 MeV
26	The Lande g factor for the level $^3D_3$ is					
	a) 2/3	b) 3/2	c) 3/4	d) 4/3	d	4/3
27	Which one of the following molecules does not exhibit a rotational spectrum?					
	a)H_2	b) CO	c) HCL	d)HBr	a	H_2
28	All vibrations producing a change in the electric dipole moment of molecule yield					
	a)Raman spectra	b) Infrared spectra	c) Ultra violet spectra	d) X-ray spectra	b	Infrared spectra
29	Line broadening is not due to					
	a)Doppler effect	b) Uncertainty principle	c)Rayleighs criterion	d) Pressure	c	Rayleighs criterion
30	Spins of boson is equal to					
	a) A positive integer	b)Integer	c)Positive integral multiple of 1/2	d)Any fraction	a	A positive integer

31	In 'Particle in a Box' problem, the walls of a particle in a box are supposed to be					
	a) Small but infinitely hard	b) Infinitely large but soft	c) Soft and Small	d) Infinitely hard and infinitely largeThermodyn	d	Infinitely hard and infinitely
32	For a particle inside a box, the potential is maximum at x =					
	a) L	b) 2L	c) L/2	d) 3L	a	L
33	Particle in a box can never be at rest.					
	a) True	b) False	c) not predictable	d) Arbitrary statement	a	True
34	To solve Schrodinger equation we need potential and					
	a) physical requirements of the system	b) boundary conditions	c) no other information	d) a and b	b	boundary conditions
35	In order to find the internal structure of nucleus, electrons should be accelerated by					
	a) 10E5 V	b) 10E7 V	c) 10E9 V	d) 10E11 V	c	10E9 V
36	The Niquist plot is a plot related to					
	a) UV-Vis spectroscopy	b) Scattering based	c) Impedance spectroscopy	d) X-ray photoelectron	c	Impedance spectroscopy
37	In He-Ne laser, the laser transition takes place in					
	a) He only	b) Ne only	c) Ne first, then He	d) He first, then in Ne	d	He first, then in Ne
38	Using UV-spectroscopy which of the following can be estimated for a semiconductor					
	a) Defects in the material	b) Doping concentration in the material	c) Electronic density of the material	d) Band Gap of the material	d	Band Gap of the material
39	Pirani gauge is used to measure					
	a) Very low pressures	b) High pressures	c) Pressures in the region 1 atm	d) Fluid flow	a	Very low pressures
40	Characteristic X-ray depend upon					
	a) Only on the nature of the target material	b) Only on the operating voltage of the X-	c) Pressure inside the X-ray tube	d) wavelength of X-rays	a	Only on the nature of the target material
41	The reason behind the internal magnetic field in ferromagnetic material is					

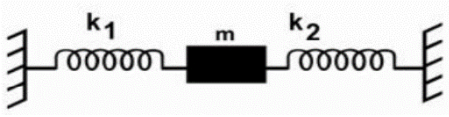
	a) Unpaired electron	b) Orbital motion of	c) Exchange interaction	d) Lenz law	c	Exchange interaction
42	For an intrinsic semiconductor, m_e^* and m_h^* are respectively the effective masses of electrons and holes near the corresponding band edges. At a finite temperature, the position of the					
	a) depends on m_e^* ; but not on m_h^*	b) depends on m_e^*; but not on m_h^*	c) depends on both m_e^*; m_h^*	d) depends neither on m_e^* ; nor on m_h^*	c	depends on both m_e^*; m_h^*
43	Which one of the following sets corresponds to fundamental particles?					
	a) quark, electron and meson	b) proton, electron and photon	c) electron, photon and neutrino	d) proton, electron and neutron	d	proton, electron and neutron

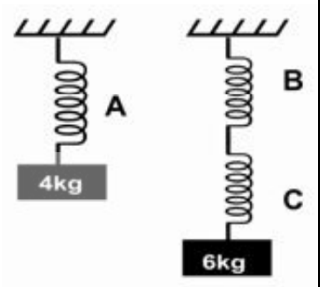
44	Average kinetic energy of gas molecules is proportional to					
	a) Thermodynamic temperature	b) Internal energy	c) Enthalpy	d) Condensation point	a	Thermodynamic temperature
45	Phonons obey					
	a) MB-statistics	b) BE-	c) FD-	d) MD-theory	b	BE-statistics
46	Carnot cycle efficiency is maximum when					
	a) Final temperature is 0^oK	b) Initial temperature is 0^oK	c) Final temperature is 0^oC	d) Initial temperature is 0^0C	a	Final temperature is 0^oK
47	A well behaved wave function should not be					
	a) finite	b) continuous	c) normalizable	d) infinite	d	infinite
48	The average Kinetic Energy in the ground state of the electron confined in one-dimensional					
	a) $3E_f$	b) $1/3E_f$	c) $3/E_f$	d) $3/5E_f$	b	$1/3E_f$
49	A simple pendulum is taken inside a deep mine. Relative to the period of oscillation on the					
	a) remains the same	b) decreases	c) increases	d) becomes infinite	c	increases
50	The lowest possible energy associated with a quantum mechanical harmonic oscillator is called					
	a) zero point energy	b) fundamental	c) elementary	d) excited energy	a	zero point energy

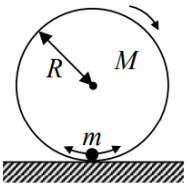
51	The unit normal vector to the surface $x^2+3y^2+2z^2=6$ at the point (2,0,1) is					
	a) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$	b) $\frac{\hat{i}-\hat{j}}{\sqrt{2}}$	c) $\frac{-\hat{i}-\hat{j}}{\sqrt{2}}$	d) $\frac{-\hat{i}+\hat{j}}{\sqrt{2}}$	a	$\frac{\hat{i}+\hat{j}}{\sqrt{2}}$
52	Which of the following is Hermitian?					
	a) $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$	b) $\begin{bmatrix} 0 & i \\ -i & 0 \end{bmatrix}$	c) $\begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$	d) $\begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$	d	$\begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$
53	The kind of singularity of the function $\frac{1}{\sin z-\cos z}$ at $z=\frac{\pi}{4}$ is					
	a) simple pole	b) double pole	c) singularity	d) non isolated	a	simple pole
54	The residue of $\frac{z^2-2z}{(z+1)^2(z^2+4)}$ at double pole as z=-1 is					
	a) 4/5	b)-4/5	c) -14/25	d) 14/25	c	-14/25
55	The value of $\int_c \frac{zdz}{\sin z}$ where C: |z|=4 is					
	a) $2\pi i$	b) $-2\pi i$	c) $4\pi i$	d) 0	d	0
56	The integrating factor of $\cos x\frac{dy}{dx}+y\sin x=\tan x$ is					
	a) sinx	b) cosx	c) tanx	d) secx	d	secx
57	$A_{lm}^{ijk}B_i^m$ is a tensor of rank					
	a) 7	b) 3	c) 5	d) 6	b	3
58	A circular loop located on $x^2+y^2=9, z=0$ carries a direct current of 10 A along $\hat{\phi}$, The value of magnetic field **H** at (0,0,4) is approximately					
	a) 0.01 $\hat{z}$	b) 0.36 $\hat{z}$	c) 0.13 $\hat{z}$	d) 0.63 $\hat{z}$	b	0.36 $\hat{z}$
59	The magnetic field intensity H due to an infinite line current at a distance r from it is proportional to					
	a) r	b) r^{-1}	c) r^{-2}	d) r^2	b	r^{-1}
60	Given the magnetic vector potential $\vec{A}=-\frac{r^2}{4}\hat{z}$ in cylindrical coordinate system, the magnetic field is					

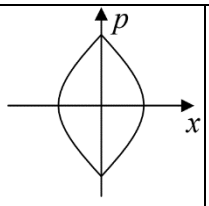
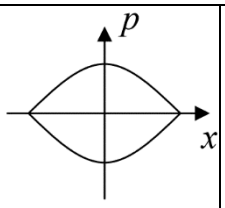
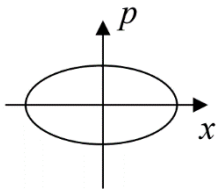
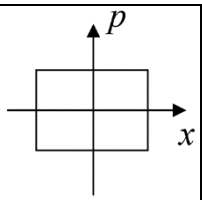
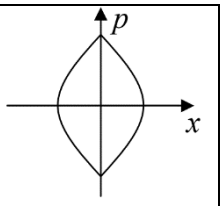
	a) $r^2\hat{\phi}$	b) $r\hat{\phi}$	c) $\frac{r^2}{2}\hat{\phi}$	d) $\frac{r}{2}\hat{\phi}$	d	$\frac{r}{2}\hat{\phi}$
61	In a current free region of relative permeability 1, the magnetic scalar potential is given by $V=-(x^2y+y^2x+z)$. The magnetic field intensity at the point (1,1,1) is					
	a) $i-j+1$	b) $i+j+1$	c) $i+3j+1$	d) $3i+3j+1$	d	$3i+3j+1$
62	On the triangular loop described by the equation: x+y+z=2, a current of 5A flows through the loop. The magnetic moment of the electric circuit formed by the loop is					
	a) 5(i+j+k)	b) 8(i+j+k)	c) 10(i+j+k)	d) 20(i+j+k)	c	10(i+j+k)
63	A sphere of radius 3 is polarized along the radius vector such that $\vec{P}=3\vec{r}$. The volume charge density is					
	a) 9	b) -8	c) -9	d) 1	c	-9
64	A plane electromagnetic wave travels in a medium of relative permeability $\mu_r=1$ and relativity permittivity $\varepsilon_r=3$. The speed of the wave in the medium will be					
	a) $\sqrt{3}\times10^8$	b) 3×10^8	c) 1×10^8	d) s	a	$\sqrt{3}\times10^8$
65	The scalar potential at the position defined by the vector $\vec{r}=x\hat{i}+z\hat{j}-y^2\hat{k}$ in a uniform electric field given by the function $\vec{E}=x^2\hat{i}-z\hat{j}-y\hat{k}$ may be given by					
	a) $(x^3-z^2+y^3)$	b) $-(x^3-z^2+y^3)$	c) $-(x^3+z+y^3)$	d) (x^3+z+y^3)	b	$-(x^3-z^2+y^3)$
66	For an alternating displacement vector $\vec{D}=\hat{i}3\cos5t$ applied to a conductor, the displacement current at time $t=\frac{\pi}{10}$ is					
	a) 15	b) -15	c) 0	d) 1.5	b	-15
67	A current distribution gives rise to the vector magnetic potential $\vec{A}=x^2y\hat{x}+y^2x\hat{y}-4xyz\hat{z}$. The magnetic field at (-1,2,5) is					
	a) $2\hat{x}+40\hat{y}+30\hat{z}$	b) $20\hat{x}+4\hat{y}+3\hat{z}$	c) $20\hat{x}+40\hat{y}+3\hat{z}$	d) $2\hat{x}+4\hat{y}+3\hat{z}$	c	$20\hat{x}+40\hat{y}+3\hat{z}$
68	The unit of magnetic dipole moment is					
	a) A m^{-2}	b) A m	c) A m^2	d) A m^{-3}	c	A m^2
69	The time average potential of a neutral hydrogen atom is given by					

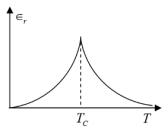
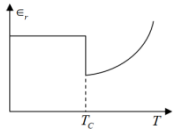
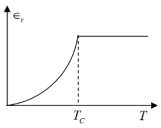
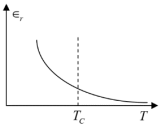
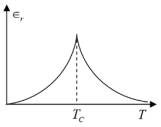
	$V=\frac{e^{-\alpha r}}{4\pi\varepsilon_0 r}\left(1+\frac{\alpha r}{2}\right)$. The volume charge density will be proportional to					
	a) r^{-1}	b) r	c) $e^{\alpha r}$	d) $e^{-\alpha r}$	d	$e^{-\alpha r}$
70	A spherical symmetric charge distribution is given by $\rho(r)=\rho_0\left(1-\frac{r^2}{a^2}\right), 0\le r\le a$. The total charge in the charge distribution is					
	a) $\frac{8}{9}\pi a^3\rho_0$	b) $\frac{8}{15}\pi a^3\rho_0$	c) $\pi a^3\rho_0$	d) $a^3\rho_0$	b	$\frac{8}{15}\pi a^3\rho_0$
71	An electric field produced by an electric dipole varies as					
	a) inversely square of distance	b) inversely cube of distance	c) inversely distance	d) inversely fourth power of distance	b	inversely cube of distance
72	Which of the following is invariant under Lorentz transformation?					
	a) $E^2-c^2B^2$	b) E^2-B^2	c) J^2	d) F_{ab}	a	$E^2-c^2B^2$
73	The radiation pattern of Hertzian dipole in the plane perpendicular to the dipole is a type of					
	a) figure of zero	b) line	c) circle	d) figure of eight	d	figure of eight
74	Which of the following is true in case of the radiation pattern of the parabola antenna?					
	a) omnidirectional	b) highly directional	c) random	d) uniform pattern	b	highly directional
75	A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field B. The force experienced by the conductor will be					
	a) 0	b) 2BIL	c) 3BIL	d) BIL^2	a	0

76	As shown in figure, a body having mass m is attached with two springs having spring constants k_1 and k_2. The frequency of oscillation is f. Now, if the springs constants of both the springs are increased 4 times, then the frequency of oscillation will be equal to 					
	a)$2f$	b)$f/2$	c)$f/4$	d)$4f$	a)	$2f$
77	The ratio of force constants of two springs is 1:5. The equal mass suspended at the free ends of both springs are performing simple harmonic motion. If the maximum acceleration for both springs are equal, the ratio of amplitudes for both springs is					
	a)$\frac{1}{\sqrt{5}}$	b)$\frac{1}{5}$	c)$\frac{5}{1}$	d)$\frac{\sqrt{5}}{1}$	c)	$\frac{5}{1}$
78	Which of the equation given below represents a S.H.M.?					
	a) Acceleration = - k (x + a) b) Acceleration = k (x + a) c) Acceleration = kx d) Acceleration = - $k_0x + k_1x^2$				a)	Acceleration = - k (x + a)
79	If the maximum velocity of two springs (both has same mass) executing S.H.M. and having force constants k_1 and k_2 respectively are same, then the ratio of their amplitudes will be					
	a) $\frac{k_1}{k_2}$	b) $\frac{k_2}{k_1}$	c) $\sqrt{\frac{k_1}{k_2}}$	d) $\sqrt{\frac{k_2}{k_1}}$	d)	$\sqrt{\frac{k_2}{k_1}}$
80	A particle executing S.H.M. has an amplitude A and periodic time T. The minimum time required by the particle (in s) to get displaced by $\frac{A}{\sqrt{2}}$ from its equilibrium position is					
	a) T	b) T/4	c) T/8	d) T/16	c)	T/8
81	The speed of a particle executing motion changes with time according to the equation y = $a\sin\omega t + b\cos\omega t$, then					
	a) Motion is periodic but not a simple harmonic motion. b) It is a simple harmonic motion with amplitude equal to $a + b$ c) It is a simple harmonic motion with amplitude equal to $a^2 + b^2$ d) Motion is a simple harmonic motion with amplitude equal to				d)	Motion is a simple harmonic motion with amplitude equal

	$\sqrt{a^2+b^2}$					to $\sqrt{a^2+b^2}$
82	The equation of wave is given by $y = 10sin\left(\frac{2\pi t}{30}+\alpha\right)$, If the displacement is 5cm at *t*=0, then the total phase *t=7.5 s will be:*					
	a)$\frac{2\pi}{3}$	b)$\frac{2\pi}{5}$	c)$\frac{2\pi}{4}$	d) $\frac{2\pi}{5}$	a)	$\frac{2\pi}{3}$
83	A small spherical steel ball is placed at a distance slightly away from the center of a concave mirror having radius of curvature 250 cm. If the ball is released, it will now move on the curved surface. What will be the periodic time of this motion? Ignore frictional force and take g = 10 m/s^2.					
	a) $\frac{\pi}{4}$ s	b) π s	c) $\frac{\pi}{4}$ s	d) 2π s	b)	π s
84	The displacement of a simple harmonic motion is given by the equation $x = A\cos(\theta t+\frac{\pi}{8})$. At what time will it attain maximum velocity?					
	a) $\frac{3\pi}{8\omega}$	b) $\frac{8\pi}{3\omega}$	c) $\frac{3\pi}{16\omega}$	d) $\frac{\pi}{16\omega}$	a)	$\frac{3\pi}{8\omega}$
85	Three identical springs are shown in figure. When a 4 kg mass is suspended from spring A, its length increases by 1 cm. Now if a 6 kg mass is suspended from the free end of spring C, then increase in its length is. 					
	a) 1.5 cm	b) 3.0 cm	c) 4.5 cm	cm	b)	cm
86	A hoop of mass M and radius R rolls without slipping along a straight line on a horizontal surface as shown in the figure. A point mass m slides without friction along thee inner surface of the hoop, performing small oscillations about the mean position. The number of degrees of freedom of the system (in integer) is					

						
	a) 3	b) 4	c) 2	d) 1	c)	2
87	If $\vec{a}$ and $\vec{b}$ are constant vectors, $\vec{r}$ and $\vec{p}$ are generalized positions and conjugate momenta, respectively, then for the transformation $Q = \vec{a} \cdot \vec{p}$ and $P = \vec{b} \cdot \vec{r}$ to be canonical, the value of a $\vec{a} \cdot \vec{b}$ is:					
	a) +1	b) -1	c) 0	d) 2	b)	+1
88	Consider the potential $U(r)$ defined as $$U(r) = -U_0 \frac{e^{-\alpha r}}{r}$$ where α and U_0 are real constants of appropriate dimensions. According to the first Born approximation, the elastic scattering amplitude calculated with $U(r)$ for a (wave vector) momentum transfer q and $\alpha \to 0$, is proportional to:					
	a) q^{-1}	b) q^{-2}	c) q	d) q^2	b)	q^{-2}
89	A spaceship moves away from Earth with a relativistic speed v and fires a shuttle craft in the forward direction at a speed v relative to the spaceship. The pilot of the shuttle craft launches a probe in the forward direction at a speed v relative to the Earth?					
	a) $3v$	b) $\frac{3v}{1-\frac{v^2}{c^2}}$	c) $\frac{1+\frac{v^2}{c^2}}{1+\frac{3v^2}{c^2}}$	d) $\frac{2v}{1+\frac{v^2}{c^2}} + v$	c)	$\frac{1+\frac{v^2}{c^2}}{1+\frac{3v^2}{c^2}}$
90	A particle moves in one dimension under a potential $V(x) = \alpha\|x\|$ with some non-zero total energy. Which one of the following best describes the particle trajectory in the phase space?					

	 a)	 b)	 c)	 d)	a)	
91	A particle of mass m is subject to the potential $V(x, y, t) = K(x^2 + y^2)$, where *x*, *y* are the Cartesian coordinates of the particle and *K* is a constant. Which one of the following quantities is a constant of motion?					
	a) $\dot{y}x + \dot{x}y$	b) $\dot{y}x - \dot{x}y$	c) $\dot{y} + \dot{x}$	d) $\dot{y}y + \dot{x}x$	b)	$\dot{y}x - \dot{x}y$
92	An interstellar object has speed *v* at the point of its shortest distance *R* from a star of much larger mass *M*. Given $v^2 = 2\,G\,M\,/R$, the trajectory of the object is					
	a) circle	b) ellipse	c) parabola	d) hyperbola	c)	parabola
93	Two bodies of mass *m* and 2*m* are connected by a spring constant *k*. The frequency of the normal mode is					
	a) $\sqrt{\frac{3k}{2m}}$	b) $\sqrt{\frac{k}{m}}$	c) $\sqrt{\frac{2k}{3m}}$	d) $\sqrt{\frac{k}{2m}}$	a)	$\sqrt{\frac{3k}{2m}}$
94	Consider a transformation from one set of generalized coordinate and momentum (*q*, *p*) to another set (*Q*, *P*) denoted by, $$Q = pq^s P = q^r$$ where s and r are constants. The transformation is canonical if					
	a) $s = 0$ and $r = 1$	b) $s = 2$ and $r = -1$	c) $s = 0$ and $r = -1$	d) $s = 2$ and $r = 1$	b)	$s = 2$ and $r = -1$
95	If H is the Hamiltonian for a free particle with mass *m*, the commutator [*x*,[*x*, H]] is					
	a) $\frac{h^2}{4\pi^2 m}$	b) $\frac{-h^2}{4\pi^2 m}$	c) $\frac{-h^2}{8\pi^2 m}$	d) $\frac{h^2}{8\pi^2 m}$	b)	$\frac{-h^2}{4\pi^2 m}$

96	In the context of small oscillations, which one of the following does NOT apply to thenormal coordinates?					
	a) Each normal coordinate has an eigen-frequency associated with it b) The normal coordinates are orthogonal to one another c) The normal coordinates are all independent d) The potential energy of the system is a sum of squares of the normal coordinates with constant coefficients				b)	The normal coordinates are orthogonal to one another
97	A π^0 meson at rest decays into two photons, which moves along the *x*-axis. They are both detected simultaneously after a time, *t* =10 s. In an inertial frame moving with a velocity *v* = 0.6c in the direction of one of the photons, the time interval between the two detections is					
	a) 15 s	b) 0 s	c) 10 s	d) 20 s	a)	15 s
98	Choose the graph that best describes the variation of dielectric constant, $\in_r$ with temperature, *T* in the ferroelectric material. $T_C$is the Curie temperature					
	(a) 	(b) 	(c) 	(d) 	a)	
99	Van der Waal's interaction potential between inert gas atoms varies with their separation as					
	a) $1/R^2$	b) $1/R$	c) $1/R^3$	d) $1/R^6$	d)	$1/R^6$
100	The donor concentration in a sample of n-type silicon is increased by a factor of 100. Assuming the sample to be non-degenerate, the shift in the Fermi level (in meV) at 300 K is:					
	a) 115.15 meV	b) 11.515 meV	c) 1151.5 meV	d) 1.1515 meV	a)	115.15 meV