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(CPG-EE-2017)

Subject: PHYSICS

Code

Sr. No. 10949

SET-"A"

Time: 11/2 Hours	Total Questions: 100	Max. Marks: 100
Roll No.	(in figure)	(in words)
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	READ THE FOLLOWING	
	dsory and carry equal marks. The	

- to attempt all questions.
- The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
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- BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISS TARTING OF THE NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION. BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL

Used for jumsling verification fortolly applications to the the state of the state

Question No.			Ques	tions	
1.				tom is 13.6 volts. Th	
	(1)	$3.4\mathrm{eV}$	(2)	6.8 eV	
	(3)	13.6 eV	(4)	27.0 eV	
2.	Dav	visson and Germe	er experiment re	elates to:	
	(1)	Interference	(2)	Electron diffraction	n
	(3)	Polarization	(4)	Quantization	
3.	The	e degree of degen	eracy for the th	ree dimensional iso	otropic harmonic
1	(1)	n²	(2)	$\frac{1}{2}$ (2n + 1) (2n + 2)	
	(3)	$\frac{1}{2}$ (n + 1) (n + 2)	(4)	2n + 1	
4.	The	de-Broglie hypot	hesis is associat	ed with:	
	(1)	Wave nature of	electrons	A 201	
	(2)	Wave nature of	α-particles		
1.3	(3)	Wave nature of 1	radiation		
	(4)	Wave nature of a	all material par	cicles	
5.	part	article is confined ticle is in the firs ticle is maximum	t excited state,	0 < x < L, in one d then the probability	imension. If the ty of finding the
	(1)	$x = \frac{L}{2}$	(2)	$x = \frac{L}{3}$	
	(3)	$x = \frac{L}{6}$	(4)	$x = \frac{L}{4}$ and $\frac{3L}{4}$	

Question No.		Quest	tions	
6.	Function of the wave ve	ector in case	of free particle motion is given by	:
	$(1) E = \frac{\hbar k^2}{2m}$	(2)	$E = \frac{\hbar^2 k^2}{2m}$	
	$(3) E = \frac{\hbar k}{2m}$	(4)	$E = \frac{\hbar^2 k^2}{2m^2}$	
7.	The densest part of a p to:	probability cl	loud occurs at a radius proportion	nal
	(1) n	(2)	n ²	
	(3) n ³	(4)	n^4	
8.	The de-Broglie waveler	igth λ for an	electron of energy 150 eV is:	
	(1) 10^{-8} m	(2)	10 ⁻¹⁰ m	
	(3) 10 ⁻¹² m	(4)	10 ⁻¹⁴ m	
9.	No two electrons will statement is called:	have all the	four quantum numbers equal. T	he
	(1) Pauli exclusion pri	nciple (2)	Uncertainty principle	
	(3) Hund's rule	(4)	Aufbau's principle	
10.	The radius of a hydroge	en atom is in	its ground state is:	
6.1	(1) 10 ⁻⁴ cm	(2)	10 ⁻⁶ cm	
	(3) 10 ⁻⁸ cm	(4)	10 ⁻¹⁰ cm	
11.	The maximum number number ℓ is:	of electrons	in a sub-shell with orbital quantu	am
	(1) $2\ell + 1$	(2)	$2\ell-1$	
	(3) $2(2\ell+1)$	(4)	$2(2\ell-1)$	

Question No.			Ques	stions
12.	Ato	oms with $\frac{1}{2}$ nuclear spin	can not	have:
	(1)	Hyperfine structure	(2)	Electric dipole interaction
	(3)	Fine structure	(4)	None of these
13.	The	e average binding energy	of a nuc	cleon in a nucleus of the atom is:
	(1)	8 eV	(2)	80 eV
	(3)	8 MeV	(4)	80 MeV
14.	orbi	ential is V (r) = k m r ³ (k t will be a circle of radiu m $\sqrt{3 \text{ ka}}$	> 0), the as 'a', abo	$ma^2 \sqrt{ka}$
	(3)	$ma^2 \sqrt{3ka}$	(4)	ma √ka
15.	The	Lande g-factor for the 3	P ₁ level	of an atom is:
	(1)	$\frac{1}{2}$	(2)	$\frac{3}{2}$
	(3)	$\frac{5}{2}$	(4)	$\frac{7}{2}$
16.	If 50 leng	kV is applied potential th of X-rays produced is	in an X	-ray tube, then the minimum wave-
	(1)	0.2 nm	(2)	2 nm

Question No.			Quest	tions
17.		ording to Moseley's law ation is proportional to th		equency of the characteristic X-ray re of:
	(1)	Atomic weight of the eler	ment	
	(2)	Atomic number of the ele	ement	
	(3)	Both (1) and (2)		
	(4)	None of these		
18.	The	continuous X-ray spectru	ım is th	ne result of:
	(1)	Photoelectric effect	(2)	Inverse photoelectric effect
	(3)	Compton effect	(4)	Auger effect
19.	Ally	10명 : BOOT : 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	nge in t	the electric dipole moment of molecule
	(1)	Raman Effect	(2)	Infrared spectra
	(3)	UV spectra	(4)	X-ray spectra
20.	Sen	niconductor laser is made	of:	
	(1)	Germanium	(2)	Silicon
	(3)	GaAs based materials	(4)	Ruby crystal
21.	- 12/4/01/01/01	es of the rotational Raman		tokes and corresponding anti-stokes um in terms of the rotational constant
	(1)	12 B	(2)	6 B
	(3)	4B	(4)	2B
22.	The	e classical electron radius	is of th	ne order of:
	(1)	10 ⁻⁸ cm	(2)	10 ⁻¹¹ cm
			(4)	

Question No.			Ques	tions
23.		e electrostatic attraction etrons of the other is call		en the nucleus of one atom and the
	(1)	Coulomb forces	(2)	Gravitational
	(3)	Strong forces	(4)	van der Waals forces
24.	Nu	clear forces are :		
	(1)	Gravitational attractive		
	(2)	Electrostatic repulsive		
	(3)	Long range and strong	attractiv	ve
	(4)	Short range and strong	attracti	ive
25.	20 1			oming from a cyclotron accelerator is cotons that can be obtained from this
4,25	(1)	10 MeV	(2)	20 MeV
	(3)	30 MeV	(4)	40 MeV
26.	The	nuclear reaction:		
		$4_{1}H^{1} \rightarrow {}_{2}He^{4} + 2_{-1}e^{0} + $	26 MeV	
	rep	resents		
	(1)	Fusion	(2)	Fission
	(3)	β-decay	(4)	γ-decay
27.	Hal	f life of a radioactive ma	terial is	s 4 days. After 20 days, the fraction
	(1)	$\frac{1}{32}$	(2)	1 20

Question No.		And the second of the second o	Quest	tions
28.	The	sun releases energy by :		
	(1)	Nuclear Fission	(2)	Nuclear Fusion
	(3)	Spontaneous Combustion	(4)	Hydro-thermal process.
29.		particle which most easily	y per	netrates through the nucleus of the
	(1)	Neutron	(2)	Electron
	(3)	Proton	(4)	Alpha particles
30.	Wh	ich of the following reaction	forb	idden?
	(1)	$\mu^- \rightarrow e^- + \nu_\mu + \overline{\nu}_e$	(2)	$\pi^+\!\to\!\mu^++\nu_\mu$
	(3)	$\pi^+ \rightarrow e^+ + \nu_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$
31.	Cho	oose the particle with zero B	aryo	n number from the list given below:
	(1)	Pion	(2)	Neutron
	(3)	Proton	(4)	Δ+
32.	Hov	w many atoms per unit cell	are in	hcp structure:
	(1)	1	(2)	2
	(3)	4	(4)	6
33.	The	e one which is not compatibl	e wit	h crystal symmetry is :
ar in this	(1)	One-fold symmetry	(2)	Three-fold symmetry
	(3)	Five-fold symmetry	(4)	Six-fold symmetry
34.		e ratio of the volume of atom ic lattice is:	s to t	he total volume available in a simple
	(1)	74%	(2)	66%
	(3)	52%	(4)	84%

Question No.			Ques	tions
35.	The	e reciprocal lattice o	of a simple cul	bic lattice is:
	(1)	Monoclinic	(2)	Triclinic
	(3)	Cubic	(4)	Orthorhombic
36.	The	e specific heat of a mic specific heat C _v	solid (atomic will be:	weight-M), for unit mass is C_v . Its
A .	(1)	C _v /M		M/C _v
	(3)	MC_v	(4)	C_{v}
37.		relationship between v_E is:	een the Einst	ien's temperature $(\theta)_E$ and Einstien
	(1)	$(\theta)_{E} = \frac{h v_{E}}{k}$	(2)	$\left(\theta\right)_{E} = \frac{v_{E}}{h k}$
	(3)	$v_{E} = \frac{h(\theta)_{E}}{k}$	(4)	$v_{E} = \frac{h k}{(\theta)_{E}}$
38.		all metals, the ra ductivity is directly		ermal conductivity to the electrical to:
	(1)	T	(2)	T^2
	(3)	The inverse of T	(4)	Inverse of T ²
39.	In t	he crystal structure	e of silicon we	have:
	(1)	Electrovalent Bond	ding	and the same of the last
	(2)	Covalent Bonding		
	(3)	Co-ordinate bondin	ng	
	(4)	Mixture of covalen	t and electro	valent bonding

Question No.	Questions
40.	For Bragg's reflection by a crystal to occur, the X-ray wavelength λ and the interatomic distance 'd' must be as :
	(1) $\lambda > 2d$ (2) $\lambda = 2d$
	(3) $\lambda \le 2d$ (4) $\lambda < 2d$
41.	The electric field at the centre of a uniformly charged conductor is:
	(1) $\frac{qr}{4\pi \in_0 R^3}$ (2) $\frac{q}{4\pi \in_0 r^2}$
	(3) Zero (4) $\frac{q}{4\pi \in_0 R^2}$
42.	The time base of a CRO is developed by :
	(1) Sawtooth waveform . (2) Square waveform
	(3) Triangular waveform (4) Sinusoidal waveform
43.	The ripple factor in a rectifier circuit means:
	(1) Amount of a.c. voltage present in output
	(2) Amount of d.c. voltage in the output
	(3) Change in d.c. voltage when input a.c. changes
	(4) Change in d.c. voltage when the load changes
44.	The cathode of a zener diode in a voltage regulator is normally:
	(1) More positive than the anode
	(2) More negative than the anode
	(3) At + 0.7 V
	(4) Grounded

Question No.			Ques	tions
45.		agrangian of a p		oving in one dimension is given by
	(1) $\frac{1}{2}$ x	$p^2 + V(x)$	(2)	$\frac{x^2}{2x} + V(x)$
	(3) $\frac{1}{2}x$	$e^2 - V(x)$	(4)	$\frac{p^2}{2x} - V(x)$
46.	How ma	any degree of free	dom a rigio	l body possess :
	(1) 3		(2)	6
	(3) 9		(4)	Infinite
47.		cylinder rolls dow	n without s	lipping on a plane, how many degrees
	(1) 1		(2)	2
	(3) 3		(4)	4
48.	The mas	ss of electron is do	ouble its re	st mass than the velocity of electron
	$(1) \frac{C}{2}$		(2)	2C
	(3) $\frac{\sqrt{3}}{2}$	<u>C</u>	(4)	$\sqrt{\frac{3}{2}}$ C
49.	The first	t law of thermody	namics is t	he conservation of:
	(1) Mon	mentum	(2)	Energy
	(3) Bot	h (1) and (2)	(4)	None of these

Question No.		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Quest	tions
50.		statistical physics, he total number of		emperature T of a system is related to Ω as :
	(1)	$kT = \frac{\partial \Omega}{\partial E}$	(2)	$kT = \frac{\partial \log \Omega}{\partial E}$
	(3)	$\frac{1}{kT} = \frac{\partial \Omega}{\partial E}$	(4)	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$
51.	Con	structive interfere	ence happens v	vhen two waves are:
	(1)	Out of phase	(2)	Zero amplitude
	(3)	In phase	(4)	In front
52.		at principle is res uce glare from ref		he fact that certain sunglasses can
17/8 158	(1)	Refraction	(2)	Polarization
	(3)	Diffraction	(4)	Total internal reflection
53.	frin			a double-slit and third order bright rees. What is the separation between
	(1)	5.0 μm	(2)	10 μm
	(3)	15 μm	(4)	20 μm
54.	the			different paths arriving at point P. If ence is to occur at point P, the two
	(1)	Arrive 180° out o	fphase	
	(2)	Arrive 90° out of	phase	demonstration of the contract
	(3)	Travel paths mus	st differ by a w	hole number of wavelengths
	(4)	Travel paths tha	t differ by an o	dd number of half-wavelengths

Question No.	Questions
55.	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:
	(1) Larger than T_0 (2) Smaller than T_0
	(3) Independent of k (4) Constantly changing
56.	Which of the following is equivalent to a unit of momentum?
	(1) Newton-meter (2) Newton-Second
	(3) Joule-Second (4) None of the above
	period of the pendulum if the length of its string were doubled, the mas of its bob were cut in half, and the force of gravity were doubled?
ALTER TO	
58.	of its bob were cut in half, and the force of gravity were doubled? (1) 0.5 S (2) 1.5 S (3) 3 sec.
58.	of its bob were cut in half, and the force of gravity were doubled? (1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer.
58.	of its bob were cut in half, and the force of gravity were doubled? (1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer. If the force is applied at the centre of the mass then torque is:
58.	of its bob were cut in half, and the force of gravity were doubled? (1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer. If the force is applied at the centre of the mass then torque is: (1) Zero (2) Maximum
	of its bob were cut in half, and the force of gravity were doubled? (1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer. If the force is applied at the centre of the mass then torque is: (1) Zero (2) Maximum (3) 1 (4) Infinity 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

Question No.		大型 (1) 10 mm (1	Quest	ions		
60.	Steel is preferred for making springs over copper for the reason:					
	(1)	Steel is cheaper				
	(2)	Steel has greater value of	Youn	g's modulus		
	(3)	Young's modulus of coppe	r is m	ore than steel		
	(4)	Steel has higher density				
61.	The	first thermodynamic law i	s cons	ervation of:		
	(1)	Momentum	(2)	Energy		
	(3)	Both	(4)	None of these		
62.	Ene	ergy in a stretched wire is:		Contract of the state of		
	(1)	$\frac{1}{2}$ (load × extension)	(2)	Load × strain		
	(3)	Stress × strain	(4)	$\frac{1}{2}$ (Stress × strain)		
63.	Wh	ich of the following set of Ņ rgy, G – Gibb's energy, H –	Maxwe	ell's relation is correct ? (U – Internal alpy 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)	$P = \left(\frac{\partial F}{\partial S}\right)_{T} \text{ and } S = \left(\frac{\partial F}{\partial P}\right)_{V}$		
64.	Par	uli's exclusive principles is	applic	able to:		
	(1)	M.B.	(2)	F.D.		
	(3)	B.E.	(4)	None of these		

Question No.			Ques	tions	
65.	The root mean square speed V_{rms} is:				
		$\left(\frac{8 \text{ kT}}{\pi \text{ m}}\right)^{1/2}$	(2)	$\left(\frac{2 kT}{\pi m}\right)^{\frac{1}{2}}$	
	(3)	$\left(\frac{2 kT}{m}\right)^{1/2}$	(4)	$\left(\frac{3 kT}{m}\right)^{1/2}$	
66.	When ice melts and become water, the ice – water system undergoes a change such that:				
Year I	(1) Entropy decreases and internal energy increases				
	(2) Entropy increases the internal energy decreases				
	(3) Entropy and Internal energy of the system increases				
	(4) Entropy and Internal energy of the system decreases				
67.	In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is:				
	(1)	$2 k_b \ell n 2$	(2)	3 k, ln 3	
	(3)	$N k_b \ell n 2$	(4)	Nk _b ln 3	
68.	Spe	cific heat of metal	ls can be expre	ssed as:	
	(1)	T^3	(2)	$AT + BT^2$	
	(3)	$AT^2 + BT^3$	(4)	$AT + BT^3$	
69.	Which of the following Maxwell's equation implies the absence of magnet monopoles?			ation implies the absence of magnetic	
Supplied	(1)	$\vec{\nabla} \cdot \vec{E} = \frac{\pi}{\epsilon_0}$	(2)	$\vec{\nabla} \cdot \vec{\mathbf{B}} = 0$	
	(3)	$\vec{\nabla} \times \vec{E} = \frac{-\partial \vec{B}}{\partial t}$	(4)	$\vec{\nabla} \times \vec{\mathbf{B}} = \left(\frac{1}{\mathbf{C}^2}\right) \frac{\partial \vec{\mathbf{B}}}{\partial t} + \mu_0 \hat{\mathbf{j}}$	

Question No.		Quest	tions		
70.	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		
71.	All materials have:				
	(1) Paramagnetic property	(2)	Ferrimagnetic property		
	(3) Ferromagnetic property	(4)	Diamagnetic property		
72.	A magnetic material has magnetiz 0.005 webers/m². Its magnetiz		ation of 3200 A/m and flux density force is:		
	(1) 780.9 A/m	(2)	1560.1 A/m		
	(3) 390.0 A/m	(4)	None of the above		
73.	The unit of dipole moment is:	T _a , as	oradic ps. un.p. u. c. r		
	(1) Coulomb	(2)	Coulomb-metre		
	(3) Metre / coulomb	(4)	Coulomb-metre ²		
74.	How many edges are there in a angles in it:	quar	tz crystal, if there are 18 faces and 14		
	(1) 30	(2)	15		
107 1	(3) 55	(4)	None of these		
75.	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		

Question No.			Ques	tions			
76.	At	At any temperature the energy of the molecules of an ideal gas is:					
	(1)		(2)	Only K.E.			
	(3)	Both K.E. and P.E.	(4)	None of these			
77.	On	e kilogram of ice melts at 0° ange in entropy is :	°C into	water at the same temperature. The			
	(1)	0	(2)	Infinite			
	(3)	0.293	(4)	293			
78.	The	e contents of which memor	y degr	ade with every read operation?			
44.2.3	(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	ALCOHOL:	Output management			
	(3)	Interrupt processing	(4)	Operating system			
80.	Which of the following is invalid in FORTRAN?						
	(1)	P + Q +	(2)	DO 100001 = 1, 5			
	(3)	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		Ala graving a value of the se			
	(2)	Is a very simple process					
	(3)	Can handle negative num	bers ea	asily			
	(4)	Avoids direct subtraction					

Question No.			Quest	ions	
83.	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)	$[f_1(w) \times f_2(w)]$	
84.		magnitude spectrum nal has one of the follo		ier transform of a real-valued time	
	(1)	NO	(2)	ODD	
	(3)	EVEN	(4)	CONJUGATE	
85.	Mas	ss of 700 N man movii	ng in a car a	at 66 km h ⁻¹ is:	
	(1)	70 kg	(2)	100 kg	
	(3)	Infinite	(4)	Zero	
86.	(1) (2) (3)	perpendicular to dir along direction of me parallel to direction	ection of motion	otion	
	(4)	both (1) and (2)			
87.	Ave	erage energy of a Plan	ck's oscillat	tion is:	
	(1)	E = hv	(2)	E = n hv	
	(3)	$E = \frac{h\nu}{(e^{h\nu/kT} - 1)}$	(4)	$E = mc^2$	
88.	Bos	sons have spin value :			
	(1)	0	(2)	1	
	(3)	$\frac{1}{2}$	(4)	0 or 1	

Question No.	Questions			tions	
89.	In	how many ways ording to B–E st	s two particles c	an be arranged in three phase cells	
No. of the	(1)	6	(2)	9	
	(3)	3	(4)	27	
90.	The	e 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	
91.	Acc	ording to which	statistics, the	energy at absolute zero can not be	
	(1)	M - B	(2)	B-E	
	(3)	F-D	(4)	None of these	
92.	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.				
93.	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.				

Question No.			Quest	cions	
94.		quantum statistics relition :	educes to cla	assical statistics under the following	
	(1)	$\rho A^3 = 1$	(2)	ρ A ³ >> 1	
	(3)	$\rho A^3 \ll 1$	(4)	$\rho = 0$	
95.		pper wire is of length Ω at 20°C. Its conduc		diameter 0.3 mm has a resistance of vill be :	
	(1)	$5.89 \times 10^7 \text{ ohm}^{-1} \text{ m}^-$	1		
	(2)	$5.89 \times 10^9 \text{ ohm}^{-1} \text{ m}^-$	1		
	(3)	$5.89 \times 10^{5} \text{ ohm}^{-1} \text{ m}^{-}$	1		
	(4)	None of the above			
96.	The to:	mobility of charge car	riers in an i	ntrinsic semiconductor is proportional	
	(1)	$T^{\frac{1}{2}}$.	(2)	T ³ / ₂	
	(3)	$\frac{1}{T^2}$	(4)	$T^{\frac{3}{2}}$ $\frac{1}{T^{\frac{3}{2}}}$	
97.	An electron, neutron and a proton have the same wavelength, which particle has greater velocity?				
	(1)	Neutron	(2)	Proton	
	(3)	Electron	(4)	None of the above	
98.	Short sightedness can be corrected if:				
	(1)	Converging lens are	e used		
	(2)	Converging mirror	is used		
	(3)	Diverging mirror is	used		
	(4)	Diverging glasses a	re used		

Question No.	Questions					
99.	The losses in a dielectric subjected to an alternating field are determined by:					
	(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.	The diamagnetic susceptibility is:					
	(1) Positive always					
	(2) Negative always					
	(3) Zero always					
	(4) All are false					

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(CPG-EE-2017)

Subject : PHYSICS

10958

Sr. No.____

Code B

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- All questions are compulsory and carry equal marks. The candidates are required to attempt all questions.
- 2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
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Question No.	Questions
1.	The maximum number of electrons in a sub-shell with orbital quantum number ℓ is:
	(1) $2\ell + 1$ (2) $2\ell - 1$
	(3) $2(2\ell+1)$ (4) $2(2\ell-1)$
2.	Atoms with $\frac{1}{2}$ nuclear spin can not have:
	(1) Hyperfine structure (2) Electric dipole interaction
	(3) Fine structure (4) None of these
3.	The average binding energy of a nucleon in a nucleus of the atom is:
	(1) 8 eV (2) 80 eV
	(3) 8 MeV (4) 80 MeV
4.	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:
	(1) $m \sqrt{3 ka}$ (2) $ma^2 \sqrt{ka}$
	(3) $ma^2 \sqrt{3ka}$ (4) $ma \sqrt{ka}$
5.	The Lande g-factor for the ³ P ₁ level of an atom is:
	(1) $\frac{1}{2}$ (2) $\frac{3}{2}$
	(3) $\frac{5}{2}$ (4) $\frac{7}{2}$

No.		Questi				
6.	If 50 kV is applied potential in an X-ray tube, then the minimum wavelength of X-rays produced is:					
	(1) 0.2 nm	(2)	2 nm			
	(3) 0.2 A	(4)	2 A°			
7.	According to Moseley's law the	he fre	quency of the characteristic X-ray re of:			
	(1) Atomic weight of the elem	ent				
	(2) Atomic number of the elec	ment				
	(3) Both (1) and (2)					
	(4) None of these		managed a finite of the second			
8.	The continuous X-ray spectrum	m is th	ne result of:			
	(1) Photoelectric effect	(2)	Inverse photoelectric effect			
	(3) Compton effect	(4)	Auger effect			
9.	All vibrations producing a change in the electric dipole moment of molecule yield:					
	(1) Raman Effect	(2)	Infrared spectra			
	(3) UV spectra	(4)	X-ray spectra			
10.	Semiconductor laser is made	of:				
	(1) Germanium	(2)	Silicon			
	(3) GaAs based materials	(4)	Ruby crystal			
11.	According to which statistic zero?	s, the	energy at absolute zero can not be			
	(1) M-B	(2)	B-E			
	(3) F-D	(4)	None of these			

6	Question No.	Questions In a grand canonical ensemble, a system A of fixed volume is in contact with a large reservoir B. Then				
	12.					
		(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.				
	13.	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.				
1		(3) A can exchange neither energy nor particles with B.				
		(4) A can exchange both energy and particles with B.				
	14.	The quantum statistics reduces to classical statistics under the following condition:				
		(1) $\rho A^3 = 1$ (2) $\rho A^3 >> 1$				
		(3) $\rho A^3 \ll 1$ (4) $\rho = 0$				
	15.	A copper wire is of length 0.5 m and diameter 0.3 mm has a resistance of 0.12 Ω at 20°C. Its conductivity (σ) will be :				
		(1) $5.89 \times 10^7 \text{ohm}^{-1} \text{m}^{-1}$				
		(2) $5.89 \times 10^9 \text{ ohm}^{-1} \text{ m}^{-1}$				
		(3) $5.89 \times 10^{5} \text{ ohm}^{-1} \text{ m}^{-1}$				
		(4) None of the above				
1	6.	The mobility of charge carriers in an intrinsic semiconductor is proportional to:				
	1	(1) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$				
		3) $\frac{1}{T^2}$ (4) $\frac{1}{T^{\frac{3}{2}}}$				

Question No.	Questions					
17.	An electron, neutron and a proton have the same wavelength, which particle has greater velocity?					
	(1) Neutron (2) Proton					
	(3) Electron (4) None of the above					
18.	Short sightedness can be corrected if:					
	(1) Converging lens are used					
	(2) Converging mirror is used					
	(3) Diverging mirror is used					
	(4) Diverging glasses are used					
19.	The losses in a dielectric subjected to an alternating field are determined by :					
	(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.					
20.	The diamagnetic susceptibility is:					
	(1) Positive always					
	(2) Negative always					
	(3) Zero always					
	(4) All are false					
21.	All materials have:					
	(1) Paramagnetic property (2) Ferrimagnetic property					
	(3) Ferromagnetic property (4) Diamagnetic property					

Question No.			Que	stions	
22.	A magnetic material has magnetization of 3200 A/m and flux densit 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	
23.	Th	e unit of dipole mor	ment is:		
	(1)	Coulomb	(2)	Coulomb-metre	
	(3)	Metre / coulomb	(4)	Coulomb-metre ²	
24.	How many edges are there in a quartz crystal, if there are 18 faces an angles in it:			tz crystal, if there are 18 faces and 1	
	(1)	30	(2)	15	
	(3)	55	(4)	None of these	
25.	The constant 'a' of a transistor is 0.95. What would be the change is collector-current corresponding to a change of 0.4 mA in the base curin a common-emitter arrangement?			change of 0.4 mA in the base grane	
	(1)	7.6 mA	(2)	15.2 mA	
	(3)	19.0 mA	(4)	None of the above	
26. At any temperature the energy of the molecules of an		e molecules of an ideal gas is :			
26.		Only P.E.	(2)	Only K.E.	
26.	(1)	omy r.m.	(2)		
26.	(1)	Both K.E. and P.E.		None of these	
27.	(3) One	Both K.E. and P.E.	. (4)		
	(3) One	Both K.E. and P.E. kilogram of ice mel	. (4)	None of these	

No.					
28.	The contents of which memory degrade with every read operation?				
	(1)	EAROM	(2)	PROM	
	(3)	EPROM	(4)	All of the above	
29.	A sy	stem call is a method by w	hich a	program makes a request to the:	
	(1)	Input management	(2)	Output management	
	(3)	Interrupt processing	(4)	Operating system	
30.	Whi	ich of the following is inval	id in F	ORTRAN?	
	(1)	P + Q +	(2)	DO 100001 = 1, 5	
	(3)	DIMENSION × (30, 20)	(4)	CONTINUE	
31.	Constructive interference happens when two waves are:				
	(1)	Out of phase	(2)	Zero amplitude	
	(3)	In phase	(4)	In front	
32.	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	
33.	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 μm	(2)	10 μm	
	(3)	15 μm	(4)	20 μm ·	

Question No.	Questions			
34.	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:			
	(1) Arrive 180° out of phase			
L-smin	(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			
35.	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:			
	(1) Larger than T ₀ (2) Smaller than T ₀			
	(3) Independent of k (4) Constantly changing			
36.	Which of the following is equivalent to a unit of momentum?			
	(1) Newton-meter (2) Newton-Second			
	(3) Joule-Second (4) None of the above			
37.	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?			
	(1) 0.5 S			
	(2) 1.5 S committee (2.5 Violente distribution of the addition			
	(3) 3 sec.			
	(4) There is not sufficient information to estimate the answer.			

uestion No.	Questions				
49.	In the	crystal structur	e of silicon we h	nave:	
40.		Electrovalent Bon		in and	
	, ,	Covalent Bonding		(1) 7486	
		Co-ordinate bond		(3) 6296	
	Evit C.	Mixture of covale		alent bonding	
	(4) N	Mixture of covare	1	accur the X-ray wavelength λ and	
50.	For B	Bragg's reflection ateratomic distar	by a crystal to ace 'd' must be a	occur, the X-ray wavelength λ and as:	
	(1) 7	λ > 2d	(2)	$\lambda = 2d$	
	(3) 7	$\lambda \leq 2d$	the Court In Control of the Control	λ < 2d okes and corresponding anti-stokes	
	B is: (1) (3)	12 B 4 B	(2) (4)	m in terms of the rotational constant 6 B 2 B	
52.	The	classical electron	n radius is of th	e order of:	
02.			(2)	10-11 000	
	(1)	10 ⁻⁸ cm	(4)	10 ⁻¹¹ cm	
	(3)	10 ⁻¹³ cm	(4)	10 ⁻¹⁵ cm	
53.	(3)	10 ⁻¹³ cm electrostatic at	(4)	10 ⁻¹⁵ cm	
53.	(3) The	10 ⁻¹³ cm electrostatic at trons of the other	traction between is called:	10 ⁻¹⁵ cm en the nucleus of one atom and the	
53.	(3)	10 ⁻¹³ cm electrostatic at	traction between is called:	on the nucleus of one atom and the	
53.	(3) The elect (1) (3)	electrostatic at trons of the othe Coulomb forces	traction between is called: (2)	on the nucleus of one atom and the	
	(3) The elect (1) (3)	electrostatic at trons of the othe Coulomb forces Strong forces	traction between is called: (2) (4)	on the nucleus of one atom and the	
	(3) The elect (1) (3) Nuc	electrostatic at trons of the othe Coulomb forces Strong forces	traction between is called: (2) (4)	on the nucleus of one atom and the	
	(3) The elect (1) (3) Nuc (1)	electrostatic at trons of the other Coulomb forces Strong forces clear forces are: Gravitational at Electrostatic re	traction between is called: (2) (4)	en the nucleus of one atom and the Gravitational van der Waals forces	

Question No.		Que	stions		
55.	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:				
	(1) 10 MeV	(2)	20 MeV		
	(3) 30 MeV	(4)	40 MeV		
56.	The nuclear reaction	:			
	$4_{1}H^{1} \rightarrow {_{2}He^{4}} + 2$	$2_{-1}e^{0} + 26 \text{ MeV}$			
10	represents				
7.	(1) Fusion	(2)	Fission		
	(3) β-decay	(4)	γ-decay		
57.	Half life of a radioactive material is 4 days. After 20 days, the fraction remaining undecayed is:				
	(1) $\frac{1}{32}$	(2)	1 20		
	(3) $\frac{1}{16}$	(4)	1/8		
58.	The sun releases energy by:				
	(1) Nuclear Fission	(2)	Nuclear Fusion		
	(3) Spontaneous Con		Hydro-thermal process.		
59.	The particle which most easily penetrates through the nucleus of the atom is:				
	(1) Neutron	(2)	Electron		
	(3) Proton	(4)	Alpha particles		
60.	Which of the following reaction forbidden?				
	$(1) \mu^- \to e^- + \nu_\mu + \overline{\nu}_e$		$\pi^+ \to \mu^+ + \nu_{\mu}$		
	$(3) \pi^+ \to e^+ + \nu_e$		$\mu^- \rightarrow e^+ + e^- + e^-$		

uestion No.	Questions				
61.	The electric field at the centre of a uniformly charged conductor is:				
	(1) $\frac{qr}{4\pi \in_0 R^3}$ (2) $\frac{q}{4\pi \in_0 r^2}$				
	(3) Zero $ (4) \frac{q}{4\pi \in_0 R^2} $				
62.	The time base of a CRO is developed by :				
	(1) Sawtooth waveform (2) Square waveform				
	(3) Triangular waveform (4) Sinusoidal waveform				
63.	The ripple factor in a rectifier circuit means:				
	(1) Amount of a.c. voltage present in output				
	(2) Amount of d.c. voltage in the output				
	(3) Change in d.c. voltage when input a.c. changes				
	(4) Change in d.c. voltage when the load changes				
64.	The cathode of a zener diode in a voltage regulator is normally:				
	(1) More positive than the anode				
	(2) More negative than the anode				
	(3) At $+0.7 \text{ V}$				
	(4) Grounded				

Question No.	Questions				
65.	If the Lagrangian of a particle moving in one dimension is given by $L = \frac{x^2}{2x} - V(x)$ then Hamiltonian is:				
	(1) $\frac{1}{2}xp^2 + V(x)$ (2) $\frac{x^2}{2x} + V(x)$				
	(3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$				
66.	How many degree of freedom a rigid body possess:				
	(1) 3 (2) 6				
13.1	(3) 9 (4) Infinite				
67.	When a cylinder rolls down without slipping on a plane, how many degrees of freedom it has:				
	(1) 1 (2) 2				
	(3) 3 (4) 4				
68.	The mass of electron is double its rest mass than the velocity of electron is:				
	(1) $\frac{C}{2}$ (2) 2C				
	(3) $\frac{\sqrt{3} \text{ C}}{2}$ (4) $\sqrt{\frac{3}{2}} \text{ C}$				
69.	The first law of thermodynamics is the conservation of:				
	(1) Momentum (2) Energy				
	(3) Both (1) and (2) (4) None of these				

Question No.	Que	stions			
70.	In statistical physics, the absolute temperature T of a system is related to the total number of accessible state Ω as :				
	$(1) kT = \frac{\partial \Omega}{\partial E} (2)$	$kT = \frac{\partial \log \Omega}{\partial E}$			
	$(3) \frac{1}{kT} = \frac{\partial \Omega}{\partial E} $	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$			
71.	The first thermodynamic law is co	nservation of:			
	(1) Momentum (2) Energy			
	(3) Both (4	None of these			
72.	Energy in a stretched wire is:				
9	(1) $\frac{1}{2}$ (load × extension) (2)	2) Load×strain			
	(3) Stress × strain (4)	1) $\frac{1}{2}$ (Stress × strain)			
73.	Which of the following set of Max energy, G – Gibb's energy, H – en	well's relation is correct? (U $-$ Internathalpy and F $-$ Helmholtz free energy)			
	(1) $T = \left(\frac{\partial U}{\partial V}\right)_S$ and $P = \left(\frac{\partial U}{\partial S}\right)_V$ (3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_S$ (4)	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) $P = \left(\frac{\partial F}{\partial S}\right)_T \text{ and } S = \left(\frac{\partial F}{\partial P}\right)_V$			
74.	Pauli's exclusive principles is app	licable to:			
	(1) M.B.	(2) F.D.			
	(3) B.E.	(4) None of these			

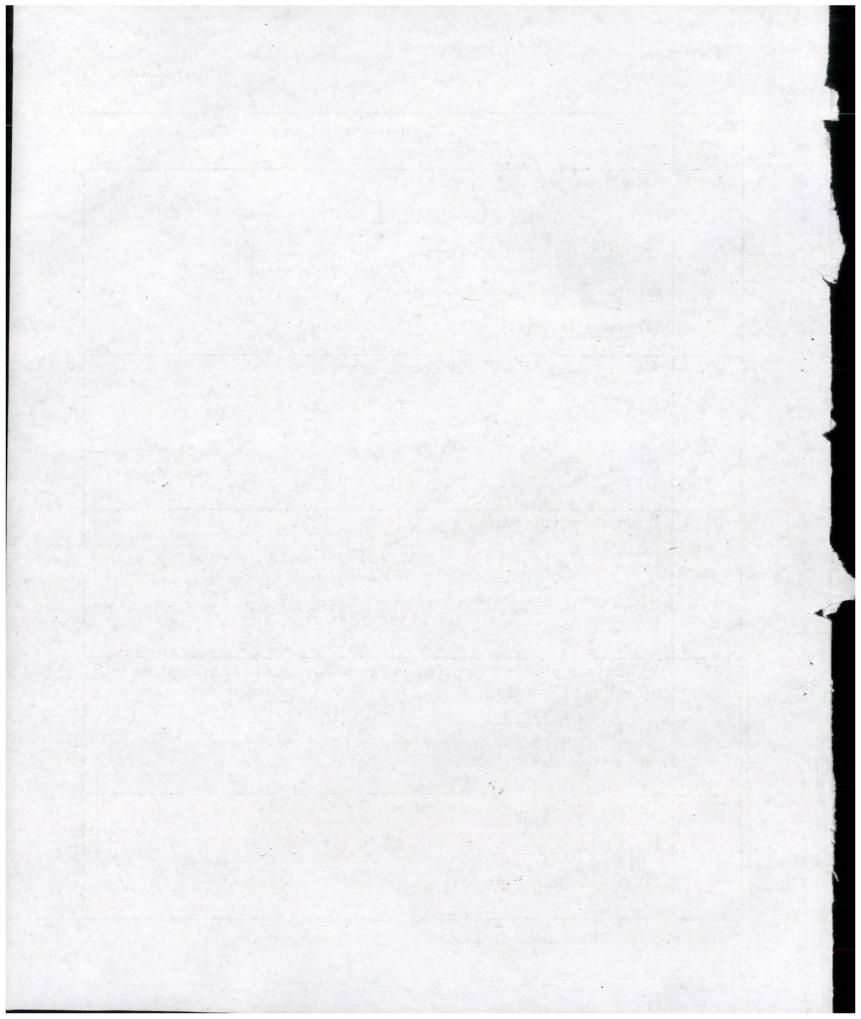
Question No.	Questions			
75.	The root mean square speed V_{rms} is:			
	$(1) \left(\frac{8 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}} \qquad (2) \left(\frac{2 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}}$			
	(3) $\left(\frac{2 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$			
76.	When ice melts and become water, the ice – water system undergoes a change such that:			
	(1) Entropy decreases and internal energy increases			
	(2) Entropy increases the internal energy decreases			
	(3) Entropy and Internal energy of the system increases			
	(4) Entropy and Internal energy of the system decreases			
77.	In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is:			
	(1) $2 k_b \ln 2$ (2) $3 k_b \ln 3$			
	(3) $N k_b \ln 2$ (4) $N k_b \ln 3$			
78.	Specific heat of metals can be expressed as:			
	(1) T^3 (2) $AT + BT^2$			
	(3) $AT^2 + BT^3$ (4) $AT + BT^3$			
79.	Which of the following Maxwell's equation implies the absence of magnetic monopoles?			
	(1) $\vec{\nabla} \cdot \vec{E} = \frac{\pi}{\varepsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$			
	(3) $\vec{\nabla} \times \vec{E} = \frac{-\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$			

nestion No.		Quest			
80.	Which of the follow magnets:	wing materials	s is used for making permanent		
	(1) Platinum Cobalt	(2)	Alnico V		
	(3) Carbon steel	(4)	All of the above		
81.	The ionization potent to remove an electro	ial of hydrogen a n from the seco	tom is 13.6 volts. The energy required nd orbit of hydrogen is :		
	(1) 3.4 eV	(2)	6.8 eV		
	(3) 13.6 eV	(4)	27.0 eV		
82.	Davisson and Germo	er experiment re	elates to:		
	(1) Interference	(2)	Electron diffraction		
	(3) Polarization	(4)			
83.	The degree of deger oscillator are:	neracy for the t	hree dimensional isotropic harmoni		
	(1) n ²	(2)	$\frac{1}{2}$ (2n + 1) (2n + 2)		
	(3) $\frac{1}{2}$ (n + 1) (n + 2)	2) (4)	2n + 1		
84.	The de-Broglie hyp	othesis is associ	ated with:		
	(1) Wave nature of electrons				
	(2) Wave nature of	of α-particles			
	(3) Wave nature of	of radiation			
1.37	(4) Wave nature of	of all material pa	articles		

Question No.	Questions
85.	A particle is confined to the region $0 < x < L$, in one dimension. If the particle is in the first excited state, then the probability of finding the particle is maximum at:
	(1) $x = \frac{L}{2}$ (2) $x = \frac{L}{3}$
	(3) $x = \frac{L}{6}$ (4) $x = \frac{L}{4}$ and $\frac{3L}{4}$
86.	Function of the wave vector in case of free particle motion is given by:
	(1) $E = \frac{\hbar k^2}{2m}$ (2) $E = \frac{\hbar^2 k^2}{2m}$
	(3) $E = \frac{\hbar k}{2m}$ (4) $E = \frac{\hbar^2 k^2}{2m^2}$
87.	The densest part of a probability cloud occurs at a radius proportional to:
	(1) n (2) n ²
	(3) n^3 (4) n^4
88.	The de-Broglie wavelength λ for an electron of energy 150 eV is:
	(1) 10^{-8} m (2) 10^{-10} m
	(3) 10^{-12} m (4) 10^{-14} m
89.	No two electrons will have all the four quantum numbers equal. The statement is called:
	(1) Pauli exclusion principle (2) Uncertainty principle
	(3) Hund's rule (4) Aufbau's principle

Question No.		Questi				
90.	The radius of a hydrogen at	om is in it	s ground state is :			
4.0000	(1) 10 ⁻⁴ cm		10 ⁻⁶ cm			
	(3) 10 ⁻⁸ cm	(4)	10 ⁻¹⁰ cm			
91.	A floating point number consists of:					
	(1) Mantissa only	(2)	Base only			
	(3) An exponent		All of the above			
92.	The chief reason why digita	l compute	ers use complemental subtraction is:			
	(1) Simplifies their circuit	tary				
	(2) Is a very simple proce	SS	10 Com 21 2 2 2 2			
	(3) Can handle negative numbers easily					
	(4) Avoids direct subtract		The second of th			
93.	The Fourier transform of given by:	fproduct	of two time functions [f ₁ (t) f ₂ (t)] is			
	(1) $[f_1(w) + f_2(w)]$	(2)	$[f_1(w) / f_2(w)]$			
	(3) $[f_1(w) * f_2(w)]$		$[f_1(w) \times f_2(w)]$			
94.	The magnitude spectrum signal has one of the follow	of a Four	rier transform of a real-valued time			
	(1) NO	(2)	ODD			
	(3) EVEN	(4)				
95.	Mass of 700 N man movin	ng in a car	at 66 km h ⁻¹ is:			
	(1) 70 kg	(2)	100 kg			
	(3) Infinite	(4)	Zero			

Question No.			Quest	tions
96.	Leng	gth contraction hap	opens only:	
	(1)	perpendicular to d	lirection of m	otion
	(2)	along direction of	motion	
	(3)	parallel to direction	on of motion	
	(4)	both (1) and (2)		
97.	Aver	age energy of a Pla	anck's oscillat	tion is:
	(1)	E = hv	(2)	E = n hv
	(3)	$E = \frac{h\nu}{(e^{h\nu/kT} - 1)}$	(4)	$\mathbf{E} = \mathbf{m}\mathbf{c}^2$
98.	Boso	ons have spin value):	
	(1)	O	(2)	1
	(3)	1/2	(4)	0 or 1
99.		ow many ways tw		an be arranged in three phase cells
	(1)	6	(2)	9
	(3)	3	(4)	27
100.	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



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(CPG-EE-2017)

Subject : PHYSICS

10955 Sr. No.

Code

			SET-"A"
Time: 11/2 Hours	Total Qu	estions: 100	Max. Marks: 100
Roll No.	(in figure)		(in words)
Name :		Date of Birth :	
Father's Name :			
Date of Examination:			

(Signature of the candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- All questions are compulsory and carry equal marks. The candidates are required to attempt all questions.
- The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
- 5. Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-Sheet.
- There will be Negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get 1/4 discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION. Wed for jurisling vertrain

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Question No.	Questions				
1.	The electric field at the centre of a uniformly charged conductor is:				
	(1) $\frac{qr}{4\pi \in_0 R^3}$ (2) $\frac{q}{4\pi \in_0 r^2}$				
	$4\pi \in_0 \mathbb{R}^3 \qquad \qquad 4\pi \in_0 \mathbb{R}^2$				
	(3) Zero (4) $\frac{q}{4\pi \epsilon_0 R^2}$				
2.	The time base of a CRO is developed by:				
	(1) Sawtooth waveform (2) Square waveform				
	(3) Triangular waveform (4) Sinusoidal waveform				
3.	The ripple factor in a rectifier circuit means:				
	(1) Amount of a.c. voltage present in output				
4	(2) Amount of d.c. voltage in the output				
	(3) Change in d.c. voltage when input a.c. changes				
	(4) Change in d.c. voltage when the load changes				
4.	The cathode of a zener diode in a voltage regulator is normally:				
	(1) More positive than the anode				
	(2) More negative than the anode				
	(3) At $+0.7 \text{ V}$				
	(4) Grounded				
5.	If the Lagrangian of a particle moving in one dimension is given by				
	$L = \frac{\dot{x}^2}{2x} - V(x)$ then Hamiltonian is:				
	(1) $\frac{1}{2}xp^2 + V(x)$ (2) $\frac{x^2}{2x} + V(x)$ (3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$				
	(3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$				

Question No.		Quest	ions		
6.	How many degree of freedom a rigid body possess:				
	(1) 3	(2)	6		
	(3) 9	(4)	Infinite		
7.	When a cylinder rolls dow of freedom it has:	vn without s	lipping on a plane, how many degrees		
	(1) 1	(2)	2		
	(3) 3	(4)	4		
8.	The mass of electron is o is:	double its re	st mass than the velocity of electron		
	$(1) \frac{C}{2}$	(2)	·2C		
	(1) $\frac{C}{2}$ (3) $\frac{\sqrt{3} C}{2}$	(4)	$\sqrt{\frac{3}{2}}$ C		
9.	The first law of thermod	lynamics is	the conservation of:		
	(1) Momentum	(2)	Energy		
	(3) Both (1) and (2)	(4)	None of these		
10.	In statistical physics, the total number of a		temperature T of a system is related ate Ω as :		
	$(1) kT = \frac{\partial \Omega}{\partial E}$	(2)	$kT = \frac{\partial \log \Omega}{\partial E}$		
	$(3) \frac{1}{kT} = \frac{\partial \Omega}{\partial E}$	(4)	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$		

Question No.			Ques	stions		
11.	The line	es of the rotationa	veen the first st l Raman spectru	stokes and corresponding anti-stoke um in terms of the rotational consta		
	(1)	12 B	(2)	6 B		
	(3)		(4)	2 B		
12.	The	e classical electro	n radius is of th	ne order of:		
	(1)	10 ⁻⁸ cm	(2)	10 ⁻¹¹ cm		
	(3)	10^{-13} cm	(4)	10 ⁻¹⁵ cm		
13.		e electrostatic at ctrons of the othe		en the nucleus of one atom and th		
	(1)	Coulomb forces	(2)	Gravitational		
	(3)	Strong forces	(4)	van der Waals forces		
14.	Nu	clear forces are:	The state of the s			
	(1)	Gravitational at	tractive			
	(2)	Electrostatic rep	pulsive			
	(3) Long range and strong attractive					
	(4) Short range and strong attractive					
15.	The maximum energy of deuteron coming from a cyclotron accele 20 MeV. The maximum energy of protons that can be obtained fraccelerator is:		oming from a cyclotron accelerator is cotons that can be obtained from the			
	(1)	10 MeV	(2)	20 MeV		
	(3)	$30\mathrm{MeV}$	(4)	40 MeV		
16.	The nuclear reaction:					
	$4_{1}H^{1} \rightarrow {}_{2}He^{4} + 2_{-1}e^{0} + 26 \text{ MeV}$					
	rep	resents		Parket Service Control		
	(1)	Fusion	(2)	Fission		
	(3)	β-decay	(4)	γ-decay		

Question No.	Questions					
17.		f life of a radioactive mater aining undecayed is:	rial is	s 4 days. After 20 days, the fraction		
	(1)	1/32	(2)	1 20		
	(3)	1/16	(4)	$\frac{1}{8}$		
18.	The	sun releases energy by:				
	(1)	Nuclear Fission	(2)	Nuclear Fusion		
	(3)	Spontaneous Combustion	(4)	Hydro-thermal process.		
19.		particle which most easily	y per	netrates through the nucleus of the		
	(1)	Neutron	(2)	Electron		
	(3)	Proton	(4)	Alpha particles		
20.	Which of the following reaction forbidden?					
	(1)	$\mu^- \rightarrow e^- + \nu_{\mu} + \overline{\nu}_e$	(2)	$\pi^+\!\to\!\mu^++\nu_\mu$		
7	(3)	$\pi^+ \to e^+ + v_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$		
21.		ionization potential of hydro emove an electron from the	Control of the same of the sam	atom is 13.6 volts. The energy required nd orbit of hydrogen is :		
	(1)	3.4 eV	(2)	6.8 eV		
	(3)	13.6 eV	(4)	27.0 eV		
22.	Day	visson and Germer experim	ent r	elates to:		
11	(1)	Interference	(2)	Electron diffraction		
	(3)	Polarization	(4)	Quantization		

Question No.	Questions
23.	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
24.	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
25.	A particle is confined to the region $0 < x < L$, in one dimension. If the particle is in the first excited state, then the probability of finding the particle is maximum at:
	(1) $x = \frac{L}{2}$ (2) $x = \frac{L}{3}$
	(3) $x = \frac{L}{6}$ (4) $x = \frac{L}{4}$ and $\frac{3L}{4}$
26.	Function of the wave vector in case of free particle motion is given by:
	(1) $E = \frac{\hbar k^2}{2m}$ (2) $E = \frac{\hbar^2 k^2}{2m}$
	(3) $E = \frac{\hbar k}{2m}$ (4) $E = \frac{\hbar^2 k^2}{2m^2}$

Question No.			Quest	tions		
27.	The to:	densest part of a probabil	ity cl	oud occurs at a radius proportional		
	(1)	n	(2)	n²		
	(3)	n^3	(4)	n ⁴		
28.	The	de-Broglie wavelength λ fo	ran	electron of energy 150 eV is:		
	(1)	10 ⁻⁸ m	(2)	10 ⁻¹⁰ m		
	(3)	10 ⁻¹² m	(4)	10 ⁻¹⁴ m		
29.		two electrons will have al	l the	four quantum numbers equal. The		
	(1)	Pauli exclusion principle	(2)	Uncertainty principle		
	(3)	Hund's rule	(4)	Aufbau's principle		
30.	The radius of a hydrogen atom is in its ground state is:					
	(1)	10 ⁻⁴ cm	(2)	10 ⁻⁶ cm		
	(3)	10 ⁻⁸ cm	(4)	10 ⁻¹⁰ cm		
31.	Acc		, the	energy at absolute zero can not be		
	(1)	M - B	(2)	B-E		
	(3)	F-D	(4)	None of these		
32.		a grand canonical ensemble th a large reservoir B. Then		ystem A of fixed volume is in contact		
	(1) A can exchange only energy with B					
	(2) A can exchange only particles with B					
	(3)	A can exchange neither e	nergy	nor particle with B.		
	(4)	A can exchange both ener	gy ar	nd particles with B.		

Question No.	Questions
33.	In a micro canonical ensemble, a system A of fixed volume is in cont 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.
34.	The quantum statistics reduces to classical statistics under the following condition:
	(1) $\rho A^3 = 1$ (2) $\rho A^3 >> 1$
	(3) $\rho A^3 \ll 1$ (4) $\rho = 0$
35.	A copper wire is of length 0.5 m and diameter 0.3 mm has a resistance 0.12 Ω at 20°C. Its conductivity (σ) will be :
	(1) $5.89 \times 10^7 \text{ ohm}^{-1} \text{ m}^{-1}$
	(2) $5.89 \times 10^9 \text{ ohm}^{-1} \text{ m}^{-1}$
	(3) $5.89 \times 10^5 \text{ ohm}^{-1} \text{ m}^{-1}$
	(4) None of the above
36.	The mobility of charge carriers in an intrinsic semiconductor is proportion to:
	(1) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$
	(3) $\frac{1}{T^2}$ (4) $\frac{1}{T^{\frac{3}{2}}}$
37.	An electron, neutron and a proton have the same wavelength, which parti- has greater velocity?
37.	An electron, neutron and a proton have the same wavelength, which parti

Question No.	Questions				
38.	Short sightedness can be corrected if:				
	(1) Converging lens are used				
	(2) Converging mirror is used				
	(3) Diverging mirror is used				
	(4) Diverging glasses are used				
39.	The losses in a dielectric subjected to an alternating field are determined by:				
	(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.				
40.	The diamagnetic susceptibility is:				
	(1) Positive always				
	(2) Negative always				
	(3) Zero always				
	(4) All are false				
41.	The first thermodynamic law is conservation of:				
	(1) Momentum (2) Energy				
	(3) Both (4) None of these				

Question No.	Questions				
42.	Energy in a stretched wire is:				
	(1) $\frac{1}{2}$ (load × extension) (2) Load × strain				
	(3) Stress × strain (4) $\frac{1}{2}$ (Stress × strain)				
43.	Which of the following set of Maxwell's relation is correct? (U – In 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) $\left(\frac{8 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$ (2) $\left(\frac{2 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$				
	(3) $\left(\frac{2 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$				

Question No.	Questions					
46.	When ice melts and become water, the ice – water system undergoes change such that:					
	(1) Entropy decreases and internal energy increases					
	(2) Entropy increases the internal energy decreases					
	(3) Entropy and Internal energy of the system increases					
	(4) Entropy and Internal energy of the system decreases					
47.	In a system of 'N' non-interacting and distinguishable particles of spin in thermodynamic equilibrium. The entropy of system is :					
	(1) $2 k_b \ln 2$ (2) $3 k_b \ln 3$					
	(3) $N k_b \ell n 2$ (4) $N k_b \ell n 3$					
48.	Specific heat of metals can be expressed as:					
	(1) T^3 (2) $AT + BT^2$					
	(3) $AT^2 + BT^3$ (4) $AT + BT^3$					
49.	Which of the following Maxwell's equation implies the absence of magnetic monopoles?					
	(1) $\vec{\nabla} \cdot \vec{E} = \frac{\pi}{\varepsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$					
	(3) $\vec{\nabla} \times \vec{E} = \frac{-\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$					
50.	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					

Question No.			estions		
51.	Cho	oose the particle with ze	ro Baryon	n number from the list given below:	
	(1)	Pion	(2)	Neutron	
	(3)	Proton	(4)	Δ^+	
52.	Hov	w many atoms per unit	cell are in	hcp structure :	
	(1)	1	(2)	2	
	(3)	4	(4)	6	
53.	The	e one which is not compa	atible witl	h 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	e reciprocal lattice of a s	imple cul	oic 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)	$\mathbf{C}_{\mathbf{v}}$	

Question No.	Questions					
57.		relationship between the quency v_E is:	Einst	tien's temperature $(\theta)_E$ and Einstien		
	(1)	$\left(\theta\right)_{\rm E} = \frac{\rm h v_{\rm E}}{\rm k}$	(2)	$(\theta)_{E} = \frac{v_{E}}{h k}$		
	(3)	$v_{E} = \frac{h(\theta)_{E}}{k}$	(4)	$v_{E} = \frac{h k}{(\theta)_{E}}$		
58.		all metals, the ratio of the ductivity is directly proport		ermal conductivity to the electrical to:		
	(1)	T	(2)	T^2		
	(3)	The inverse of T	(4)	Inverse of T ²		
59.	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					
60.	For Bragg's reflection by a crystal to occur, the X-ray wavelength λ and the interatomic distance 'd' must be as :					
	(1)	$\lambda > 2d$	(2)	$\lambda = 2d$		
	(3)	$\lambda \leq 2d$	(4)	$\lambda < 2d$		
61.	All	materials have:				
	(1)	Paramagnetic property	(2)	Ferrimagnetic property		
	(3)	Ferromagnetic property	(4)	Diamagnetic property		

Questions A magnetic material has magnetization of 3200 A/m and flux density 0.005 webers/m². Its magnetization force is:					
(3)	390.0 A/m	(4)	None of the above		
The	e unit of dipole momer	nt is:			
(1)	Coulomb	(2)	Coulomb-metre		
(3)	Metre / coulomb	(4)	Coulomb-metre ²		
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		
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		
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		
One kilogram of ice melts at 0°C into water at the same temperature. The change in entropy is:					
141	0	(2)	Infinite		
(1)		, ,			
	(1) (3) The (1) (3) How ang (1) (3) The coll in a (1) (3) At a (1) (3) One	 (1) 780.9 A/m (3) 390.0 A/m The unit of dipole moment (1) Coulomb (3) Metre / coulomb How many edges are ther angles in it: (1) 30 (3) 55 The constant 'α' of a trancollector-current correspoin a common-emitter arrance (1) 7.6 mA (3) 19.0 mA At any temperature the extension of the constant of the constant	A magnetic material has magnetiz 0.005 webers/m². Its magnetization (1) 780.9 A/m (2) (3) 390.0 A/m (4) The unit of dipole moment is: (1) Coulomb (2) (3) Metre / coulomb (4) How many edges are there in a quarangles in it: (1) 30 (2) (3) 55 (4) The constant 'α' of a transistor is 0.3 collector-current corresponding to a in a common-emitter arrangement? (1) 7.6 mA (2) (3) 19.0 mA (4) At any temperature the energy of the constant transport of the con		

Question No.	Questions					
68.	The	contents of which memory	degra	ade with every read operation?		
	(1)	EAROM	(2)	PROM		
	(3)	EPROM	(4)	All of the above		
69.	A sy	ystem call is a method by w	which a	a program makes a request to the:		
	(1)	Input management	(2)	Output management		
	(3)	Interrupt processing	(4)	Operating system		
70.	Wh	ich of the following is inval	id in F	ORTRAN?		
	(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.		e magnitude spectrum of nal has one of the following		rier transform of a real-valued time netry:		
	(1)	NO	(2)	ODD		
	(3)	EVEN	(4)	CONJUGATE		

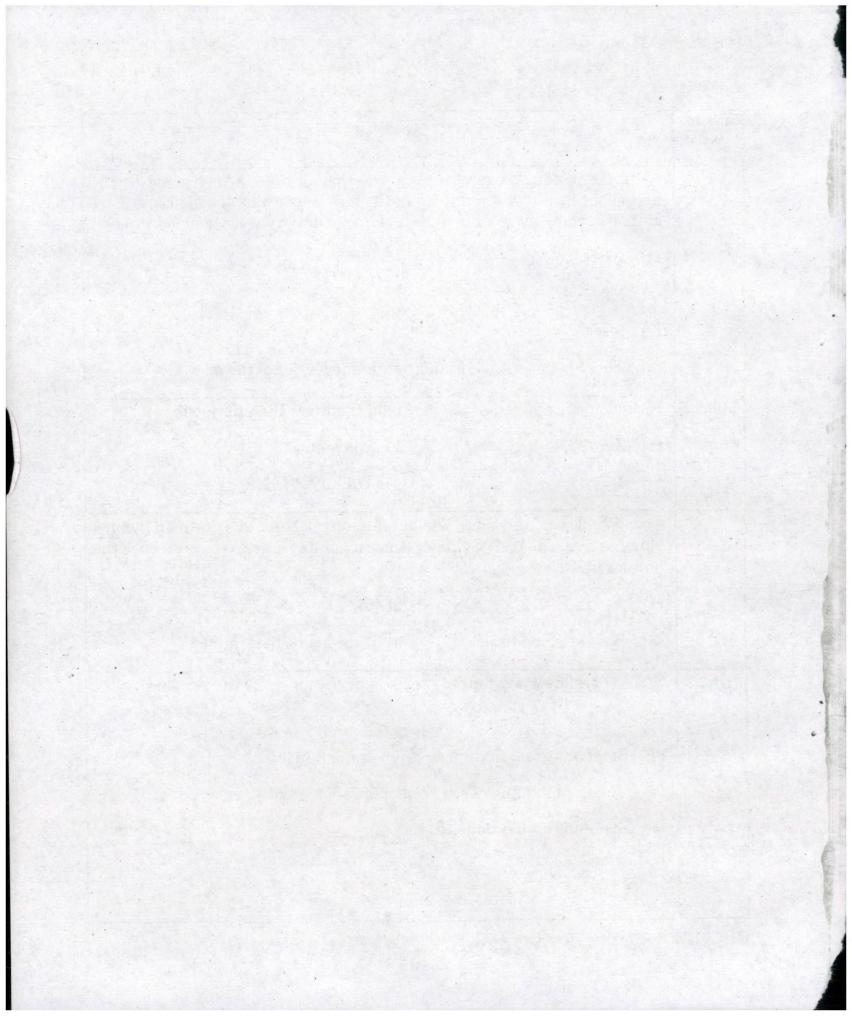
Question No.	Questions Mass of 700 N man moving in a car at 66 km h ⁻¹ is:					
75.						
	(1)	70 kg	(2)	100 kg		
	(3)	Infinite	(4)	Zero		
76.	Len	gth contraction	happens only:			
	(1)	perpendicular	to direction of m	otion		
	(2)	along direction	of motion			
	(3)	parallel to dire	ction of motion			
	(4)	both (1) and (2)				
77.	Ave	rage energy of a	Planck's oscillat	ion is :		
10.00	(1)	E = hv	(2)	E = n hv		
	(3)	$E = \frac{h\nu}{(e^{h\nu/kT} - 1)}$	(4)	$E = mc^2$		
78.	Bos	ons have spin va	lue:	of Carl Hermito (la)	erna / Fire	
	(1)	0		1 (2 (2) (2)		
		1				
	(3)	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	Test 1	
	(3)	3	(4)	27		
80.	The	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		

Questions The maximum number of electrons in a sub-shell with orbital quantum number ℓ is :					
					(1)
(3)	2 (2 (+ 1)	(4)	2 (2 (-1)		
Ato	ms with $\frac{1}{2}$ nuclear spin	can not h	ave:		
(1)	Hyperfine structure	(2)	Electric dipole interaction		
(3)	Fine structure	(4)	None of these		
The average binding energy of a nucleon in a nucleus of the atom is :					
(1)	8 eV	(2)	80 eV		
(3)	8 MeV	(4)	80 MeV		
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:					
(1)	$m\sqrt{3 ka}$	(2)	$ma^2 \sqrt{ka}$		
(3)	$ma^2 \sqrt{3ka}$	(4)	ma √ka		
The	Lande g-factor for the	³ P ₁ level	of an atom is:		
(1)	1/2	(2)	$\frac{3}{2}$		
(3)	$\frac{5}{2}$	(4)	$\frac{7}{2}$		
	(1) (3) Ator (1) (3) The (1) (3) A p pote orbi (1) (3) The (1) (3)	number ℓ is: (1) $2\ell + 1$ (3) $2(2\ell + 1)$ Atoms with $\frac{1}{2}$ nuclear spin (1) Hyperfine structure (3) Fine structure The average binding energy (1) 8 eV (3) 8 MeV A particle of mass 'm', more potential is V (r) = k m r ³ (to orbit will be a circle of radii (1) $m \sqrt{3} \text{ ka}$ (3) $ma^2 \sqrt{3} \text{ ka}$ The Lande g-factor for the content of the content o	The maximum number of electrons number ℓ is: (1) $2\ell+1$ (2) (3) $2(2\ell+1)$ (4) Atoms with $\frac{1}{2}$ nuclear spin can not have the structure (2) (3) Fine structure (4) The average binding energy of a nuclear spin can not have the structure (4) The average binding energy of a nuclear spin can not have the structure (4) A particle of mass 'm', moves under potential is V (r) = k m r³ (k > 0), the orbit will be a circle of radius 'a', about (1) m $\sqrt{3}$ ka (2) (3) ma² $\sqrt{3}$ ka (4) The Lande g-factor for the 3 P ₁ level (1) $\frac{1}{2}$ (2)		

Question No.	Questions					
86.		0 kV is applied potential gth of X-rays produced is		K-ray tube, then the minimum wave-		
	(1)	0.2 nm	(2)	2 nm		
	(3)	0.2 A	(4)	2 A°		
87.		ording to Moseley's law iation is proportional to the		equency of the characteristic X-ray		
	(1)	Atomic weight of the ele	ment			
	(2)	Atomic number of the el	ement			
	(3)	Both (1) and (2)				
	(4) None of these					
88.	The continuous X-ray spectrum is the result of:					
	(1)	Photoelectric effect	(2)	Inverse photoelectric effect		
	(3)	Compton effect	(4)	Auger effect		
89.	All vibrations producing a change in the electric dipole moment of molecule yield:					
	(1)	Raman Effect	(2)	Infrared spectra		
	(3)	UV spectra	(4)	X-ray spectra		
90.	Semiconductor laser is made of:					
	(1)	Germanium	(2)	Silicon		
	(3)	GaAs based materials	(4)	Ruby crystal		
91.	Con	Constructive interference happens when two waves are:				
	(1)	Out of phase	(2)	Zero amplitude		
		In phase	(4)	In front		

Question No.	Lillostions				
92.	What principle is responsi reduce glare from reflected	ble for t	the fact that certain sunglasses cars?		
	(1) Refraction	(2)	Polarization		
	(3) Diffraction	(4)	Total internal reflection		
93.	Light of wavelength 575 nm fringe is seen at an angle of double slits?	falls or 6.5 degr	a double-slit and third order brightees. What is the separation between		
	(1) 5.0 μm	(2)	10 μm		
	(3) 15 μm	(4)	20 μm		
	Two beams of coherent light travel different paths arriving at point P. I the maximum constructive interference is to occur at point P, the two beams must: (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				
95.	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:				
	(1) Larger than T ₀	(2)	Smaller than T ₀		
	(3) Independent of k	(4)	Constantly changing		
96.	Which of the following is equ	ivalent	to a unit of momentum?		
A.	(1) Newton-meter	(2)	Newton-Second		
	(3) Joule-Second	(4)	None of the above		

Question No.	Questions					
97.	per	iod of the pendulum i	f the length	period of 1.5 s. What would be the of its string were doubled, the mass orce of gravity were doubled?		
	(1)	0.5 S				
	(2)	1.5 S				
	(3)	3 sec.				
	(4)	There is not sufficie	nt informat	ion to estimate the answer.		
98.	If t	he force is applied at	the centre of	of the mass then torque is:		
	(1)	Zero	(2)	Maximum		
	(3)	1	(4)	Infinity		
99.	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?					
	(1)	A	(2)	В		
	(3)	Both at same time	(4)	Can not be determined		
100.	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					



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(CPG-EE-2017)

Subject : PHYSICS

10956 Sr. No.

Code

SET-"A"

Time: 1½ Hours	Total Qu	uestions: 100	Max. Marks: 100
Roll No.	(in figure)		(in words)
Name :		Date of Birth :	
Father's Name :		Mother's Name :	
Date of Examination :			

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Question No.			Que	stions
1.	All	materials have:		
	(1)	Paramagnetic property	(2)	Ferrimagnetic property
	(3)	Ferromagnetic property	(4)	Diamagnetic property
2.	A n	nagnetic material has mag 05 webers/m². Its magnetiz	gnetiz ation	zation of 3200 A/m and flux density 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	v many edges are there in a les in it :	quar	tz crystal, if there are 18 faces and 14
	(1)	30	(2)	15
	(3)	55	(4)	None of these
5.	colle	constant 'α' of a transistor ector-current corresponding common-emitter arrangem	to a	95. What would be the change in the change of 0.4 mA in the base current
	(1)	7.6 mA	(2)	15.2 mA
	(3)	19.0 mA	(4)	None of the above
6.	At a	ny temperature the energy	of th	e 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.		e kilogram of ice melts at 0° nge in entropy is:	C into	water at the same temperature. The		
	(1)	0	(2)	Infinite		
	(3)	0.293	(4)	293		
8.	The	contents of which memory	y degr	ade with every read operation?		
	(1)	EAROM	(2)	PROM		
	(3)	EPROM	(4)	All of the above		
9.	A sy	ystem call is a method by w	which a	a program makes a request to the :		
	(1)	Input management	(2)	Output management		
1	(3)	Interrupt processing	(4)	Operating system		
10.	Which of the following is invalid in FORTRAN?					
	(1)	P + Q +	(2)	DO 100001 = 1, 5		
	(3)	DIMENSION \times (30, 20)	(4)	CONTINUE		
11.	Cor	structive interference hap	pens v	when two waves are:		
	(1)	Out of phase	(2)	Zero amplitude		
	(3)	In phase	(4)	In front		
12.		at principle is responsible uce glare from reflected su		he fact that certain sunglasses can		
	(1)	Refraction	(2)	Polarization		
-	(3)	Diffraction	(4)	Total internal reflection		
13.	friņ			a a double-slit and third order bright rees. What is the separation between		
	(1)	5.0 μm	(2)	10 μm		
2 5	(3)	15 μm	(4)	20 μm		

Question No.			Que	estions
14.	the	yo beams of coherent li e maximum constructi ams must :	ght travel ive interfe	l different paths arriving at point P. erence is to occur at point P, the tw
	(1)	Arrive 180° out of ph	nase	
	(2)	Arrive 90° out of pha	ise	and the second s
	(3)	Travel paths must d	iffer by a v	whole number of wavelengths
	(4)			odd number of half-wavelengths
15.	ior	ce if proportional to the	ne speed v	parmonic oscillation with period T_0 . A softhe particle, $f = -kv$, is introduced by, the period with facting is:
	(1)	Larger than T ₀	(2)	
	(3)	Independent of k	(4)	Constantly changing
16.	Wh	ich of the following is	equivalent	t to a unit of momentum?
	(1)	Newton-meter	(2)	Newton-Second
	(3)	Joule-Second	(4)	None of the above
17.	per	iod of the pendulum if	the length	period of 1.5 s. What would be the hof its string were doubled, the mass force of gravity were doubled?
		0.5 S		
	(2)	1.5 S		
	(3)	3 sec.		
	(4)	There is not sufficien	t informat	tion to estimate the answer.
18.	If th	ne force is applied at th	he centre	of the mass then torque is:
	(1)	Zero	(2)	Maximum
The second secon				

Question No.			Quest	cions
19.	star			ifferent masses roll down an incline, as a greater mass. Which reaches the
	(1)	A	(2)	В
	(3)	Both at same time	(4)	Can not be determined
20.	Stee	el is preferred for maki	ng spring	s over copper for the reason:
	(1)	Steel is cheaper		
	(2)	Steel has greater valu	e of Youn	g's modulus
	(3)	Young's modulus of co	pper is m	ore than steel
	(4)	Steel has higher densi	ty	
21.	Cho	oose the particle with ze	ero Baryo	n number from the list given below:
	(1)	Pion	(2)	Neutron
	(3)	Proton	(4)	Δ^{+}
22.	Hov	w many atoms per unit	cell are ir	hcp structure :
	(1)	1	(2)	2
	(3)	4	(4)	6
23.	The	e one which is not compa	atible wit	h crystal symmetry is :
	(1)	One-fold symmetry	(2)	Three-fold symmetry
	(3)	Five-fold symmetry	(4)	Six-fold symmetry
24.		e ratio of the volume of a ic lattice is :	atoms to t	he total volume available in a simple
	(1)	74%	(2)	66%
	(3)	52%	(4)	84%

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 sol atomic specific heat C _v wil	id (atomic weight-M), for unit mass is C_v . It ll be:
	(1) C _v /M	(2) M/C _v
	(3) MC _v	(4) C _v
27.	The relationship between frequency v_E is:	the Einstien's temperature $(\theta)_E$ and Einstien
	$(1) (\theta)_{E} = \frac{h v_{E}}{k}$	(2) $(\theta)_E = \frac{v_E}{h k}$
	(3) $v_E = \frac{h(\theta)_E}{k}$	$(4) v_E = \frac{h k}{(\theta)_E}$
28.	For all metals, the ratio conductivity is directly pro	of the thermal conductivity to the electrical
	(1) T	(2) T ²
	(3) The inverse of T	(4) Inverse of T ²
29.	In the crystal structure of s	silicon we have :
Had the	(1) Electrovalent Bonding	
	(2) Covalent Bonding	
	(3) Co-ordinate bonding	
		d electrovalent bonding

Question No.		Questi	
30.	For Bragg's reflection by a c the interatomic distance 'd' r	rystal to nust be a	occur, the X-ray wavelength λ and is:
	$(1) \lambda > 2d$	(2)	$\lambda = 2d$
	(3) $\lambda \leq 2d$	(4)	$\lambda < 2d$
31.	The maximum number of el number ℓ is:	ectrons i	n a sub-shell with orbital quantum
	(1) $2\ell + 1$	(2)	$2\ell-1$
	(3) $2(2\ell+1)$	(4)	$2(2\ell-1)$
32.	Atoms with $\frac{1}{2}$ nuclear spin	can not h	nave:
	(1) Hyperfine structure	(2)	Electric dipole interaction
	(3) Fine structure	(4)	None of these
33.	The average binding energy	y of a nuc	cleon in a nucleus of the atom is:
	(1) 8 eV	(2)	80 eV
	(3) 8 MeV	(4)	80 MeV
34.	A particle of mass 'm', more potential is V (r) = k m r ³ (orbit will be a circle of radi	k > 0), th	r the action of a central force whose en angular momentum for which the out the origin is:
	(1) $m\sqrt{3 \text{ ka}}$	(2)	$ma^2 \sqrt{ka}$
	(3) $ma^2 \sqrt{3ka}$	(4)	ma √ka

Question No.			Que	stions			
35.	Th	The Lande g-factor for the ³ P ₁ level of an atom is:					
	(1)	1/2	(2)	3 2			
	(3)	5 2	(4)	$\frac{7}{2}$			
36.	If 5	0 kV is applied pote gth of X-rays produc	ntial in an X	X-ray tube, then the minimum wave			
	(1)	0.2 nm	(2)	2 nm			
1	(3)	0.2 A	(4)	2 A°			
37.	rad	lation is proportiona	l to the squa	equency of the characteristic X-ray			
	(1)	Atomic weight of the Atomic number of t					
	(3)	Both (1) and (2)					
	(4)	None of these					
38.	The	continuous X-ray sp	ectrum is th	ne result of :			
	(1)	Photoelectric effect	(2)	Inverse photoelectric effect			
	(3)	Compton effect	(4)	Auger effect			
39.		vibrations producing					
39.	All	vibrations producing		Auger effect he electric dipole moment of molecule Infrared spectra			

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:					
14	(1) $\rho A^3 = 1$ (2) $\rho A^3 >> 1$					
	(3) $\rho A^3 << 1$ (4) $\rho = 0$					

Question No.	Questions				
45.	A copper wire is of length 0.5 m and diameter 0.3 mm has a resistance of 0.12 Ω at 20°C. Its conductivity (σ) will be:				
	(1) $5.89 \times 10^7 \text{ ohm}^{-1} \text{ m}^{-1}$				
	(2) $5.89 \times 10^9 \text{ ohm}^{-1} \text{ m}^{-1}$				
	(3) $5.89 \times 10^5 \text{ ohm}^{-1} \text{ m}^{-1}$				
	(4) None of the above				
46.	The mobility of charge carriers in an intrinsic semiconductor is proportional to:				
	(1) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$				
	(1) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$ (3) $\frac{1}{T^2}$ (4) $\frac{1}{T^{\frac{3}{2}}}$				
47.	An electron, neutron and a proton have the same wavelength, which particle has greater velocity?				
	(1) Neutron (2) Proton				
	(3) Electron (4) None of the above				
48.	Short sightedness can be corrected if:				
E family	(1) Converging lens are used				
	(2) Converging mirror is used				
	(3) Diverging mirror is used				
	(4) Diverging glasses are used				
49.	The losses in a dielectric subjected to an alternating field are determined by:				
	(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.				

Question No.		Questions			
50.	The diamagnetic susceptibil	ity is:			
	(1) Positive always				
	(2) Negative always				
	(3) Zero always				
	(4) All are false				
51.	The first thermodynamic la	w 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 × extension)	(2) Load×strain			
	(3) Stress × strain	(4) $\frac{1}{2}$ (Stress × 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 $P = \left(\frac{\partial U}{\partial S}\right)$	(2) $V = \left(\frac{\partial H}{\partial P}\right)_S$ and $T = \left(\frac{\partial H}{\partial S}\right)_P$			
7	(3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_T$				
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.	The root mean square speed V_{rms} is :	STATE OF THE PARTY			
	(1) $\left(\frac{8 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$ (2) $\left(\frac{2 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$				
	(3) $\left(\frac{2 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \text{kT}}{\text{m}}\right)^{\frac{1}{2}}$				
56.	When ice melts and become water, the ice - change such that:	water system undergoes a			
	(1) Entropy decreases and internal energy in	creases			
1 1 2	(2) Entropy increases the internal energy de-	creases			
	(3) Entropy and Internal energy of the system increases				
	(4) Entropy and Internal energy of the system decreases				
57.	In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is:				
	(1) $2 k_b ln 2$ (2) $3 k_b ln 3$				
	(3) $N k_b \ell n 2$ (4) $N k_b \ell n 3$				
58.	Specific heat of metals can be expressed as:				
	(1) T^3 (2) $AT + BT^2$				
	(3) $AT^2 + BT^3$ (4) $AT + BT^3$				
59.	Which of the following Maxwell's equation implemonopoles?	es the absence of magnetic			
	(1) $\vec{\nabla} \cdot \vec{E} = \frac{\pi}{\varepsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$				
	(3) $\vec{\nabla} \times \vec{E} = \frac{-\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\vec{Q} + \vec{Q} + \vec{B} - \vec{Q} + \vec{B} - $	$\frac{1}{c^2} \left(\frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j} \right)$			

Question No.	on Questions						
60.	Which of the following materials is used for making permanent magnets:						
	(1)	Platinum Cobalt	(2)	Alnico V			
talle.	(3)	Carbon steel	(4)	All of the above			
61.	A fl	oating point number o	consists of				
11-11	(1)	Mantissa only	(2)	Base only			
	(3)	An exponent	(4)	All of the above			
62.	The	chief reason why digi	tal comput	ers use complemental subtraction is :			
	(1)	Simplifies their circu	uitary				
	(2) Is a very simple process						
	(3) Can handle negative numbers easily						
	(4)	Avoids direct subtra	ction				
63.	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)	$[f_1(w) \times f_2(w)]$			
64.	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			
65.	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			

Question No.			Que	estions	
66.	(1) (2) (3)	along direction	to direction of n		
	(4)				
67.	Ave	erage energy of a	Planck's oscilla	ation is :	
		$E = h\nu$		E = n hv	
	(3)	$E = \frac{h\nu}{(e^{h\nu/kT} - 1)}$	(4)	$E = mc^2$	
68.	Bos	ons have spin va	lue:		
	(1)		(2)	1	
	(3)	$\frac{1}{2}$		0 or 1	
69.	In how many ways two particles can be arranged in three phase cells according to B–E statistics?				
	(1)		- (2)	9	
	(3)	3	(4)		
70.	The	average energy		Fermi gas at 0° K is	
		0.24 f		0.44 f	
	(3)	0.64 f		0.8 f	
71.	The electric field at the centre of a uniformly charged conductor				
	(1)	$\frac{qr}{4\pi \in_0 R^3}$	(2)	$\frac{q}{4\pi \in_0 r^2}$	
	(3)	Zero	(4)	$\frac{q}{4\pi \in_0 R^2}$	

vestion No.	Questions					
72.	The time base of a CRO is developed by:					
	(1) Sawtooth waveform (2) Square waveform					
	(3) Triangular waveform (4) Sinusoidal waveform					
73.	The ripple factor in a rectifier circuit means:					
	(1) Amount of a.c. voltage present in output					
	(2) Amount of d.c. voltage in the output					
	(3) Change in d.c. voltage when input a.c. changes					
	(4) Change in d.c. voltage when the load changes					
74.	The cathode of a zener diode in a voltage regulator is normally:					
	(1) More positive than the anode					
	(2) More negative than the anode					
	(3) At $+0.7 \text{ V}$					
	(4) Grounded					
75.	If the Lagrangian of a particle moving in one dimension is given by					
	$L = \frac{x^2}{2x} - V(x) \text{ then Hamiltonian is :}$					
	(1) $\frac{1}{2}xp^2 + V(x)$ (2) $\frac{x^2}{2x} + V(x)$					
,	(3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$					
76.	How many degree of freedom a rigid body possess:					
	(1) 3 (2) 6					
	(3) 9 (4) Infinite					

Question No.		Que	estions		
77.	When a cylinder rolls down without slipping on a plane, how many degrees of freedom it has:				
	(1) 1	(2) 2		
	(3) 3	(4)) 4		
78.		ouble its 1	est mass than the velocity of electron		
	(1) $\frac{C}{2}$ (3) $\frac{\sqrt{3} C}{2}$	(2)	2C		
	(3) $\frac{\sqrt{3} \text{ C}}{2}$	(4)	$\sqrt{\frac{3}{2}}$ C		
79.	The first law of thermodyn	namics is	the conservation of :		
	(1) Momentum		Energy		
	(3) Both (1) and (2)		None of these		
80.	In statistical physics, the to the total number of acce	absolute t	temperature T of a system is related ate Ω as:		
	$(1) kT = \frac{\partial \Omega}{\partial E}$	(2)	$kT = \frac{\partial \log \Omega}{\partial E}$		
	$(3) \frac{1}{kT} = \frac{\partial \Omega}{\partial E}$	(4)	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$		
	The separation between the lines of the rotational Rama B is:	ne first st in spectru	okes and corresponding anti-stokes m in terms of the rotational constant		
	(1) 12 B	(2)	6 B		
	(3) 4 B	(4)	2 B		

uestion No.	Questions					
82.	The classical electron radius is of the order of:					
	(1) 10^{-8} cm (2) 10^{-11} cm					
	(3) 10^{-13} cm (4) 10^{-15} cm					
83.	The electrostatic attraction between the nucleus of one atom and the electrons of the other is called:					
	(1) Coulomb forces (2) Gravitational					
	(3) Strong forces (4) van der Waals forces					
84.	Nuclear forces are:					
	(1) Gravitational attractive					
(** /	(2) Electrostatic repulsive					
	(3) Long range and strong attractive					
	(4) Short range and strong attractive					
85.	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:					
	(1) 10 MeV (2) 20 MeV					
	(3) 30 MeV (4) 40 MeV					
86.	The nuclear reaction:					
	$4_{1}H^{1} \rightarrow {}_{2}He^{4} + 2_{-1}e^{0} + 26 \text{ MeV}$					
	represents					
	(1) Fusion (2) Fission					
	(3) β-decay (4) γ-decay					

Question No.			Que	stions		
87.	Half life of a radioactive material is 4 days. After 20 days, the fraction remaining undecayed is:					
	(1)	1/32	(2)	1 20		
	(3)	1/16	(4)	$\frac{1}{8}$		
88.	The	e sun releases energy by :				
	(1)	Nuclear Fission	(2)	Nuclear Fusion		
	(3)	Spontaneous Combustion	(4)	Hydro-thermal process.		
89.	The particle which most easily penetrates through the nucleus of the atom is:					
	(1)	Neutron	(2)	Electron		
	(3)	Proton	(4)	Alpha particles		
90.	Which of the following reaction forbidden?					
	(1)	$\mu^-\!\to\!e^-\!+\!\nu_\mu^{}\!+\!\overline{\nu}_e^{}$	(2)	$\pi^+ \to \mu^+ + \nu_{\mu}$		
	(3)	$\pi^+ \rightarrow e^+ + \nu_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$		
91.	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		

Question No.	Questions				
92.	Davisson and Germer experiment relates to:				
	(1) Interference (2) Electron diffraction				
	(3) Polarization (4) Quantization				
93.	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				
94.	The de-Broglie hypothesis is associated with:				
	(1) Wave nature of electrons				
	(2) Wave nature of α-particles(3) Wave nature of radiation				
	(3) Wave nature of radiation (4) Wave nature of all material particles				
95.	A particle is confined to the region $0 < x < L$, in one dimension. If the particle is in the first excited state, then the probability of finding the particle is maximum at:				
	(1) $x = \frac{L}{2}$ (2) $x = \frac{L}{3}$				
	(3) $x = \frac{L}{6}$ (4) $x = \frac{L}{4}$ and $\frac{3L}{4}$				

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

Srl. No.	CODE-A	CODE-B	2017 ANSWER K	CODE-D
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99				

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