(Total No. of printed pages : 20)

10010

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(CPG-EE-2017) Subject : PHYSICS

Code			Sr. No
Code A			SET-"A"
Time: 1½ Hours	Total Qu	estions : 100	Max. Marks : 100
Roll No	(in figure)		(in words)
Name :	Service of	Date of Birth :	and the second second
Father's Name :		Mother'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.

- 1. 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.
- 3. 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.
- 4. 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 <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
- 6. There will be <u>Negative</u> marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. 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.

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Question No.			Ques	tions		
1.	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		
2.	Day	visson and Germer	r experiment re	elates to :	Contraction of the last	
	(1)	Interference	(2)	Electron di	ffraction	
	(3)	Polarization	(4)	Quantizatio	on	
3.	The	e degree of degene illator are :	racy for the th	ree dimensi	onal isotropic harmonic	
	(1)	n²	(2)	$\frac{1}{2}(2n+1)($	(2n + 2)	
	(3)	$\frac{1}{2}$ (n + 1) (n + 2)	(4)	2n + 1		
4.	The	e de-Broglie hypoth	nesis is associat	ed with :		
	(1)	Wave nature of e	lectrons		A DE LA DEST	
	(2)	Wave nature of a	-particles			
1.1	(3)	Wave nature of ra	adiation			
	(4)	Wave nature of a	ll material part	cicles	a shart a she	
5.	part	article is confined ticle is in the first ticle is maximum a	excited state,	0 < x < L, in then the pr	n one dimension. If the obability of finding the	
•	(1)	$x = \frac{L}{2}$	(2)	$x = \frac{L}{3}$		
	(3)	$x = \frac{L}{6}$	(4)	$x = \frac{L}{4}$ and $\frac{L}{4}$	<u>BL</u>	

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Question No.		Ques	tions
6.	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)	$E = \frac{\hbar^2 k^2}{2m^2}$
7.	The densest part of a to :	ı probability cl	loud occurs at a radius proportional
	(1) n	(2)	n ²
	(3) n ³	(4)	n ⁴
8.	The de-Broglie wavel	ength 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 wil statement is called :	l have all the	four quantum numbers equal. The
	(1) Pauli exclusion p	rinciple (2)	Uncertainty principle
	(3) Hund's rule	(4)	Aufbau's principle
10.	The radius of a hydro	gen atom is in	its ground state is :
f section	(1) 10^{-4} cm	(2)	10 ⁻⁶ cm
	(3) 10^{-8} cm	(4)	10^{-10} cm
11.	The maximum numb number ℓ is :	er of electrons	in a sub-shell with orbital quantum
1	(1) $2\ell + 1$	(2)	$2\ell-1$
1.1.1	(3) $2(2\ell+1)$	(4)	$2(2\ell - 1)$

Question No.			Ques	tions		
12.	Atoms 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	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.	pote orbi	article of mass 'm', move ential is V (r) = k m r ³ (k t will be a circle of radius $m \sqrt{3 ka}$	> 0), the s 'a', abo	the action of a central force whose en angular momentum for which the out the origin is : $ma^2 \sqrt{ka}$		
	(0)	$ma^2 \sqrt{3ka}$	(4)	ma √ka		
15.		ma² √3ka Lande g-factor for the ³ I	1			
15.			1			
15.	The		P ₁ level o			
15.	The (1) (3) If 50	Lande g-factor for the ³ H $\frac{1}{2}$ $\frac{5}{2}$	(2) (4)	of an atom is : $\frac{3}{2}$		
	The (1) (3) If 50	Lande g-factor for the ³ I $\frac{1}{2}$ $\frac{5}{2}$ kV is applied potential	(2) (4)	of an atom is : $\frac{3}{2}$ $\frac{7}{2}$		

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Question No.			Quest	tions		
17.	According to Moseley's law the frequency of the characteristic X-ray radiation is proportional to the square of :					
and and	(1)	Atomic weight of the elem	nent			
279	(2)	Atomic number of the ele	ement			
	(3)	Both (1) and (2)				
	(4)	None of these				
18.	The	continuous X-ray spectru	ım is tł	ne result of :		
	(1)	Photoelectric effect	(2)	Inverse photoelectric effect		
	(3)	Compton effect	(4)	Auger effect		
19.	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		
20.	Sen	niconductor laser is made	of:	The second second		
	(1)	Germanium	(2)	Silicon		
	(3)	GaAs based materials	(4)	Ruby crystal		
21.		es of the rotational Raman		tokes and corresponding anti-stokes um in terms of the rotational constant		
	(1)	12 B	(2)	6 B		
	(3)	4 B	(4)	2 B		
22.	The	e classical electron radius	is of th	ne order of :		
	(1)	10 ⁻⁸ cm	(2)	10 ⁻¹¹ cm		

		Ques	tions
			en the nucleus of one atom and th
(1)	Coulomb forces	(2)	Gravitational
(3)	Strong forces	(4)	van der Waals forces
Nu	clear forces are :		
(1)	Gravitational attrac	tive	
(2)	Electrostatic repulsi	ive	and the second of the
(3)	Long range and stro	ng attractiv	ve
(4)	Short range and stre	ong attracti	ve
201	MeV. The maximum e		
(1)	10 MeV	(2)	20 MeV
(3)	30 MeV	(4)	40 MeV
The	nuclear reaction :		
	$4_{1}H^{1} \rightarrow {}_{2}He^{4} + 2_{-1}e^{4}$	• + 26 MeV	
rep	resents		
(1)	Fusion	(2)	Fission
(3)	β-decay	(4)	γ-decay
		material is	s 4 days. After 20 days, the fraction
(1)	$\frac{1}{32}$	(2)	$\frac{1}{20}$
	$\frac{1}{16}$		$\frac{1}{8}$
	elec (1) (3) Nuc (1) (2) (3) (4) The 20 I acco (1) (3) The rep: (1) (3) Hall rem	electrons of the other is a (1) Coulomb forces (3) Strong forces Nuclear forces are : (1) Gravitational attract (2) Electrostatic repulse (3) Long range and strond (4) Short range and strond (4) Short range and strond (5) MeV. The maximum energy of 20 MeV. The maximum	(3) Strong forces (4) Nuclear forces are : (1) Gravitational attractive (2) Electrostatic repulsive (3) Long range and strong attractive (4) Short range and strong attractive (4) Short range and strong attractive (4) Short range and strong attractive (5) MeV. The maximum energy of deuteron conditions (1) 10 MeV (2) (3) 30 MeV (2) (3) 30 MeV (4) The nuclear reaction : $4_1H^1 \rightarrow _2He^4 + 2_{-1}e^6 + 26$ MeV represents (1) Fusion (2) (3) β -decay (4) Half life of a radioactive material is remaining undecayed is :

(5)

Question No.	Questions						
28.	The sun releases energy by :						
	(1)	Nuclear Fission	(2)	Nuclear Fusion			
	(3)	Spontaneous Combustion	(4)	Hydro-thermal process.			
29.		particle which most easily m is :	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)	$\pi^+ \!\rightarrow\! \mu^+ + \nu_\mu$			
	(3)	$\pi^+ \rightarrow e^+ + \nu_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$			
31.	Cho	oose the particle with zero B	Baryo	n number from the list given below :			
	(1)	Pion	(2)	Neutron			
	(3)	Proton	(4)	Δ*			
32.	How	w many atoms per unit cell	are in	n hcp structure :			
	(1)	1	(2)	2			
	(3)	4	(4)	6			
33.	The	e one which is not compatibl	e wit	h crystal symmetry is :			
6.5-3-56	(1)	One-fold symmetry	(2)	Three-fold symmetry			
	(3)	Five-fold symmetry	(4)	Six-fold symmetry			
34.		e ratio of the volume of atom vic lattice is :	is to t	he total volume available in a simple			
	(1)	74%	(2)	66%			
	(3)	52%	(4)	84%			

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Question No.			Ques	tions		
35.	The reciprocal lattice of a simple cubic lattice is :					
	(1)	Monoclinic	(2)	Triclinic		
	(3)	Cubic	(4)	Orthorhombic		
36.		e specific heat of a s mic specific heat C _v v		e weight-M), for unit mass is C_v . Its		
National	(1)	C _v /M	(2)	M/C _v		
	(3)	MC _v	(4)	C _v		
37.		e relationship betwee Juency v_E is :	en the Einst	tien's temperature $(\theta)_{E}$ and Einstien		
	(1)	$(\theta)_{\rm E} = \frac{\rm h v_{\rm E}}{\rm k}$	(2)	$(\theta)_{\rm E} = \frac{{\rm v}_{\rm E}}{{\rm h}{\rm k}}$		
	(3)	$v_E = \frac{h(\theta)_E}{k}$	(4)	$v_E = \frac{h k}{(\theta)_E}$		
38.		all metals, the rat ductivity is directly j		ermal conductivity to the electrical to :		
1.1	(1)	Т	(2)	T^2		
	(3)	The inverse of T	(4)	Inverse of T ²		
39.	In t	he crystal structure	of silicon we	have :		
	(1)	Electrovalent Bond	ing	and the second second		
	(2)	Covalent Bonding				
	(3)	Co-ordinate bondin	g			
	(4)	Mixture of covalent	and electro	valent handing		

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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) $\lambda \leq 2d$ (4) $\lambda \leq 2d$
41.	The electric field at the centre of a uniformly charged conductor is :
	(1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$
	(3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$
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 :
1.6	(1) Amount of a.c. voltage present in output
1.0.1	(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

		Ques	tions
· If t	he Lagrangian of a	particle mo	oving in one dimension is given by
L=	$\frac{x^2}{2x} - V(x)$ then Ham	uiltonian is :	
		(2)	$\frac{x^2}{2x} + V(x)$
(3)	$\frac{1}{2}x^2 - V(x)$	(4)	$\frac{p^2}{2x} - V(x)$
How	w many degree of free	edom a rigio	l body possess :
(1)	3	(2)	6
(3)	9	(4)	Infinite
		vn without s	lipping on a plane, how many degrees
(1)	1 .	(2)	2
(3)	3	(4)	4
The is :	e mass of electron is o	louble its re	st mass than the velocity of electron
(1)	<u>C</u> 2	(2)	2C
(3)	$\frac{\sqrt{3}C}{2}$	(4)	$\sqrt{\frac{3}{2}}$ C
The	first law of thermod	ynamics is t	he conservation of :
(1)	Momentum	(2)	Energy
(3)	Both (1) and (2)	(4)	None of these
	L = (1) (3) Hov (1) (3) Wh of f (1) (3) The is: (1) (3) The (1) (3)	$L = \frac{x^2}{2x} - V(x) \text{ then Ham}$ (1) $\frac{1}{2}xp^2 + V(x)$ (3) $\frac{1}{2}x^2 - V(x)$ How many degree of free (1) 3 (3) 9 When a cylinder rolls dow of freedom it has : (1) 1 (3) 3 The mass of electron is of is : (1) $\frac{C}{2}$ (3) $\frac{\sqrt{3}C}{2}$ The first law of thermod (1) Momentum	If the Lagrangian of a particle model $L = \frac{x^2}{2x} - V(x)$ then Hamiltonian is :(1) $\frac{1}{2}xp^2 + V(x)$ (2)(3) $\frac{1}{2}x^2 - V(x)$ (4)How many degree of freedom a rigin(1)3(2)(3)9(4)When a cylinder rolls down without soof freedom it has :(1)(1)1(2)(3)3(4)The mass of electron is double its resis :(1) $\frac{C}{2}$ (2)(3) $\sqrt{3}C$ (4)The first law of thermodynamics is to(1)Momentum(2)

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P.T.O.

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Question No.			Quest	ions	
50.		l physics, the number of acc		emperature T of a system is to Ω as :	related
	(1) $kT = \frac{\partial \Omega}{\partial E}$		(2)	$kT = \frac{\partial \log \Omega}{\partial E}$	
	(3) $\frac{1}{kT} = \frac{\partial \Omega}{\partial E}$	2	(4)	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$	
51.	Constructive	e interference	e happens v	vhen two waves are :	
	(1) Out of p	ohase	(2)	Zero amplitude	
	(3) In phas	e ·	(4)	In front	
52.		ple is respor from reflect		he fact that certain sunglass ?	es can
17/9/10/9	(1) Refract	ion	(2)	Polarization	
	(3) Diffract	tion	(4)	Total internal reflection	
53.		n at an angle		a double-slit and third order ees. What is the separation b	
	(1) 5.0 µm		(2)	10 µm	
	(3) 15 µm		(4)	20 µm	
54.		im constructi	-	lifferent paths arriving at poi ence is to occur at point P, t	
•	(1) Arrive	180° out of ph	nase		
	(2) Arrive	90° out of pha	ase		
	(3) Travel	paths must d	iffer by a w	hole number of wavelengths	
	(4) Travel	paths that di	ffer by an o	dd number of half-wavelength	IS

Question No.	Questions	
55.	A particle of mass 'm' undergoes harmonic oscillation with period T force 'f' proportional to the speed v of the particle, $f = -kv$, is introduce If the particle continues to oscillate, the period with f acting is :	o. A
	(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 m of its bob were cut in half, and the force of gravity were doubled ? (1) 0.5 S	ast
	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.	as
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. 	88
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. If the force is applied at the centre of the mass then torque is : 	255
58.	of its bob were cut in half, and the force of gravity were doubled ? 0.5 S 1.5 S 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 : Zero Maximum 	ne
	of its bob were cut in half, and the force of gravity were doubled ? 0.5 S 1.5 S 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 : Zero Maximum 1 * Infinity Two cylinders of the same size but different masses roll down an inclistarting from the rest. Cylinder A has a greater mass. Which reaches	ne

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Question No.			Quest	ions
60.	 (1) (2) (3) 	l is preferred for making s Steel is cheaper Steel has greater value of Young's modulus of coppe Steel has higher density	Youn	
61.	The	first thermodynamic law	is cons	ervation of :
	(1)	Momentum	(2)	Energy
	(3)	Both	(4)	None of these
62.		rgy in a stretched wire is : $\frac{1}{2}$ (load × extension)		
	(3)	2 (Ioau × extension) Stress × strain		$\frac{1}{2}$ (Stress × strain)
63.				ell's relation is correct ? (U – Internal alpy and F – Helmholtz free energy)
	(1)	$T = \left(\frac{\partial U}{\partial V}\right)_{S} \text{ and } P = \left(\frac{\partial U}{\partial S}\right)_{V}$	(2)	$V = \left(\frac{\partial H}{\partial P}\right)_{S} \text{ and } T = \left(\frac{\partial H}{\partial S}\right)_{P}$
	(3)	$P = \left(\frac{\partial G}{\partial V}\right)_{T} \text{ and } V = \left(\frac{\partial G}{\partial P}\right)_{S}$	(4)	$P = \left(\frac{\partial F}{\partial S}\right)_{T} \text{ and } S = \left(\frac{\partial F}{\partial P}\right)_{V}$
64.	Pau	li's exclusive principles is	applic	able to :
	(1)	M.B.	(2)	F.D.
	(3)	B.E.	(4)	None of these

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Question No.	Questions
65.	The root mean square speed V_{rms} is :
	(1) $\left(\frac{8 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$ (2) $\left(\frac{2 \text{ kT}}{\pi \text{ m}}\right)^{\frac{1}{2}}$
ST.	(3) $\left(\frac{2 \text{ kT}}{\text{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \text{ kT}}{\text{m}}\right)^{\frac{1}{2}}$
66.	When ice melts and become water, the ice – water system undergoes a change such that :
Marrie 1	(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 in thermodynamic equilibrium. The entropy of system is :
1-2-1	(1) $2 k_b \ell n 2$ (2) $3 k_b \ell n 3$
	(3) $N k_b \ell n 2$ (4) $N k_b \ell n 3$
68.	Specific heat of metals can be expressed as :
1.2.2.1	(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 magnetic monopoles ?
100	(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) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$

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Question No.			Quest	tions
70.		ich of the following mat gnets:	erial	s is used for making permanent
	(1)	Platinum Cobalt	(2)	Alnico V
	(3)	Carbon steel	(4)	All of the above
71.	All	materials have :	P.C.	
	(1)	Paramagnetic property	(2)	Ferrimagnetic property
and a	(3)	Ferromagnetic property	(4)	Diamagnetic property
72.		nagnetic material has mag 05 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	e unit of dipole moment is :	C. AL	and the success of the second s
	(1)	Coulomb	(2)	Coulomb-metre
in the second	(3)	Metre / coulomb	(4)	Coulomb-metre ²
74.		w many edges are there in a gles in it :	quar	tz crystal, if there are 18 faces and 14
	(1)	30	(2)	15
1073-10	(3)	55	(4)	None of these
75.	coll		g 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

Question No.			Ques	stions		
76.	At	any temperature the energ	y of the	he molecules of an ideal gas is :		
1. 200	(1)		(2)			
6	(3)	Both K.E. and P.E.	(4)	None of these		
77.	On cha	e kilogram of ice melts at 0° ange in entropy is :	°C into	o water at the same temperature. The		
	(1)	0	(2)	Infinite		
	(3)	0.293	(4)	293		
78.	The	e contents of which memory	y degr	ade with every read operation ?		
	(1)	EAROM	(2)	PROM		
1	(3)	EPROM	(4)	All of the above		
79.	A system call is a method by which a program makes a request to the :					
	(1)	Input management	(2)	COUNTRAL RELEASE STRAF STRAFT, AND AND A		
	(3)	Interrupt processing	(4)	Operating system		
80.	Wh	ich of the following is invali	id in F	'ORTRAN ?		
	(1)	P + Q +	(2)	DO 100001 = 1, 5		
-	(3)	DIMENSION × (30, 20)	(4)	CONTINUE		
81.	Afl	oating point number consis	sts of :			
Constant 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		Margarevintes Ale -Ale -		
	(2)	Is a very simple process		all same a start of the second		
	(3)	Can handle negative num	bers ea	asily		
	(4)	Avoids direct subtraction				

(15)

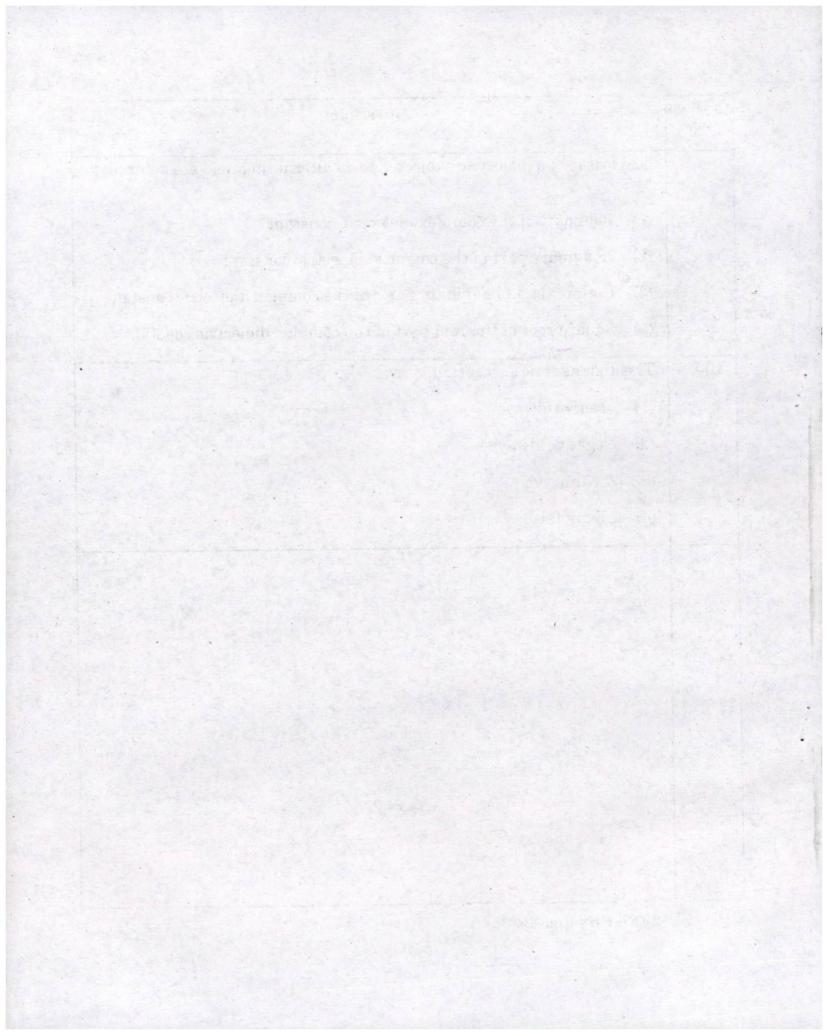
Question No.			Quest	tions		
83.	The Fourier transform of product of two time functions $[f_1(t) f_2(t)]$ is given by :					
1.1.1	(1)	$[f_1(w) + f_2(w)]$	(2)	$[f_1(w) / f_2(w)]$		
	(3)	$[f_1(w) * f_2(w)]$	(4)	$[f_1(w) \times f_2(w)]$		
84.		magnitude spectrum al has one of the foll		rier transform of a real-valued time netry :		
	(1)	NO	(2)	ODD		
	(3)	EVEN	(4)	CONJUGATE		
85.	Mas	ss of 700 N man mov	ing in a car a	at 66 km h ⁻¹ is :		
1.15	(1)	70 kg	(2)	100 kg		
	(3)	Infinite	(4)	Zero		
86.	Len	igth contraction happ	oens only :			
	(1)	(1) perpendicular to direction of motion				
S. C.	(2)	along direction of n	notion			
	(3)	parallel to direction	n of motion			
	(4)	both (1) and (2)				
87.	Ave	erage energy of a Plan	nck's oscillat	tion is :		
	(1)	E = hv	(2)	E = n hv		
	(3)	$\mathbf{E} = \frac{\mathbf{h}\mathbf{v}}{(\mathbf{e}^{\mathbf{h}\mathbf{v}/\mathbf{k}\mathbf{T}}-1)}$	(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
89.	In how many ways two pa according to B–E statistics	rticles can be arranged in three phase cells ?
Sec. Sec.	(1) 6	(2) 9
	(3) 3	(4) 27
90.	The average energy of an ele	ectron in Fermi gas at 0° K is
	(1) 0.24 f	(2) 0.44 f
	(3) 0.64 f	(4) 0.8 f
91.	According to which statistizero ?	cs, the energy at absolute zero can not be
	(1) M – B	(2) $B - E$
100	(3) $F - D$	(4) None of these
92.	In a grand canonical ensem with a large reservoir B. The	ble, a system A of fixed volume is in contact en
	(1) A can exchange only end	ergy with B
1	(2) A can exchange only par	rticles with B
	(3) A can exchange neither	energy nor particle with B.
		ergy and particles with B.
93.	In a micro canonical ensemb with a large reservoir B. The	ole, a system A of fixed volume is in contact n.
	(1) A can exchange only ene	ergy with B
	(2) A can exchange only par	ticles with B.
	(3) A can exchange neither	energy nor particles with B.
	(4) A can exchange both end	ergy and particles with B.

CPG-EE-2017-Physics-Code-A

Question No.			Quest	ions	
94.	The quantum statistics reduces to classical statistics under the following condition :				
1. 1993	(1)	$\rho A^3 = 1$	(2)	$\rho A^3 >> 1$	
	(3)	ρ A ³ << 1	(4)	$\rho = 0$	
95.		opper wire is of length Ω at 20°C. Its conduct		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:		iers in an i	ntrinsic semiconductor is proportional	
	(1)	т ^{1/2} .	(2)	T ^{3/2}	
	(3)	$\frac{1}{T^2}$	(4)	$\frac{1}{T^{\frac{3}{2}}}$	
97.		electron, neutron and a greater velocity ?	proton hav	ve the same wavelength, which particle	
	(1)	Neutron	(2)	Proton	
	(3)	Electron	(4)	None of the above	
98.	She	ort sightedness can be	corrected	if:	
	(1)	Converging lens are	used		
	(2)	Converging mirror is	sused		
a line .	(3)	Diverging mirror is a	used		
1.1.1	(4)	Diverging glasses ar	e 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
22	(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



(Total No. of printed pages : 20)

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	(CPG-	EE-2017)	
	Subject	: PHYSICS	10958
Code B			Sr. No SET-"A"
Time: 1½ Hours	Total Qu	estions : 100	Max. Marks : 100
Roll No	(in figure)		(in words)
Name :		Date of Birth :	
Father's Name :		Mother's Name :	
Date of Examination : _			

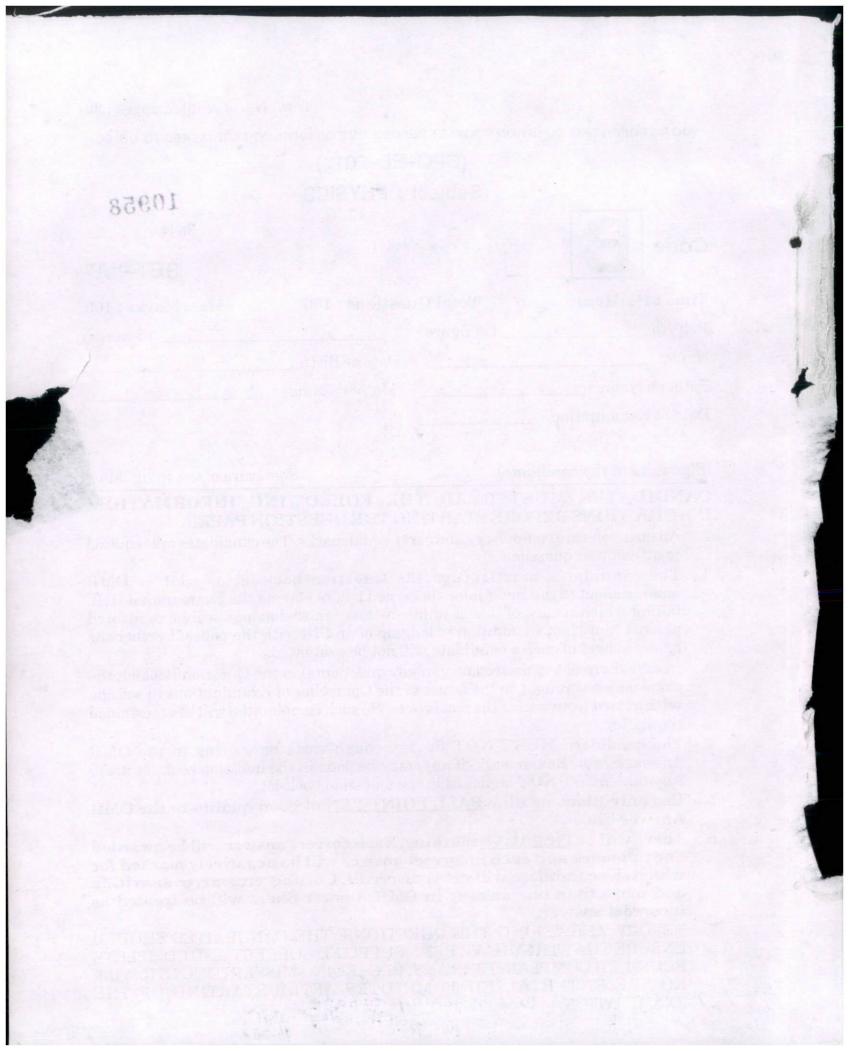
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CANDIDATES MUST READ THE FOLLOWING INFORMATION INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. 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.
- 3. 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.
- 4. 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 <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
- 6. There will be <u>Negative</u> marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. 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 to public the factor

6.70 M



Question No.		A States of the	Que	stions
1.	Th	e maximum number mber ℓ is :	of electron	s in a sub-shell with orbital quantur
	(1)	$2\ell + 1$	(2)	$2\ell - 1$
	(3)	2 (2ℓ + 1)	(4)	$2(2\ell - 1)$
2.	Ato	oms with $\frac{1}{2}$ nuclear sp	oin can not	have :
	(1)	Hyperfine structure	(2)	Electric dipole interaction
	(3)			None of these
3.	The	e average binding ener	rgy of a nuc	eleon in a nucleus of the atom is :
		8 eV	(2)	the second s
	(3)	8 MeV	(4)	80 MeV
4.	-	article of mass 'm', m ential is V (r) = k m r^3 t will be a circle of rac		the action of a central force whose an angular momentum for which the ut 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 o	f an atom is :
	(1)	$\frac{1}{2}$	(2)	$\frac{3}{2}$
	(3)	$\frac{5}{2}$	(4)	72

(1)

Question No.		Questi	ions
6.	If 50 kV is applied potential in length of X-rays produced is :	n an X-	ray tube, then the minimum wave-
	(1) 0.2 nm	(2)	2 nm
	(3) 0.2 A	(4)	2 A°
7.	According to Moseley's law radiation is proportional to the	the fre le squa	quency of the characteristic X-ray re of :
	(1) Atomic weight of the eler	nent	
	(2) Atomic number of the ele	ement	
	(3) Both (1) and (2)		
No.	(4) None of these		
8.	The continuous X-ray spectru	ım is tl	ne result of :
	(1) Photoelectric effect	(2)	Inverse photoelectric effect
	(3) Compton effect	(4)	Auger effect
9.	All vibrations producing a cha yield :	nge in t	the electric dipole moment of molecule
	(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 ?	cs, the	energy at absolute zero can not be
-	(1) M – B	(2)	B-E
	(3) F – D	(4)	None of these

12.	 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. (4) A can exchange both energy and particles with B. (5) 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 only particles with B. (4) A can exchange neither energy nor particles with B. (5) A can exchange neither energy nor particles with B. (6) A can exchange neither energy nor particles with B.
13.	 A can exchange only energy with B A can exchange only particles with B A can exchange neither energy nor particle with B. A can exchange both energy and particles with B. A can exchange both energy and particles with B. In a micro canonical ensemble, a system A of fixed volume is in contact with a large reservoir B. Then. A can exchange only energy with B A can exchange only particles with B. A can exchange only particles with B. A can exchange neither energy nor particles with B.
13.	 (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. (4) 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.
13.	 (3) A can exchange neither energy nor particle with B. (4) A can exchange both energy and particles with B. (5) 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.
13.	 (4) A can exchange both energy and particles with B. 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.
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. (3) A can exchange neither energy nor particles with B.
	(2) A can exchange only particles with B.(3) A can exchange neither energy nor particles with B.
	(3) A can exchange neither energy nor particles with B.
	(3) A can exchange neither energy nor particles with B.(4) A can exchange both energy and 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) $\rho A^3 << 1$ (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
16. 7	The mobility of charge carriers in an intrinsic semiconductor is proportional to :
((2) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$
(3) $\frac{1}{T^2}$ (4) $\frac{1}{T^{\frac{3}{2}}}$
G-EE-2	P.T.O.

(3)

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 :				
· Second S	(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				
ing and	(4) Square root of the real part of the complex dielectric constant.				
20.	The diamagnetic susceptibility is :				
	(1) Positive always				
	(2) Negative always				
Sec. 3	(3) Zero always				
	(4) All are false				
21.	All materials have :				
	(1) Paramagnetic property (2) Ferrimagnetic property				
	(3) Ferromagnetic property (4) Diamagnetic property				

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.	The	e unit of dipole mom	ent is :		
	(1)	Coulomb	(2)	Coulomb-metre	
-	(3)	Metre / coulomb	(4)	Coulomb-metre ²	
24. How many edges are there in angles in it :			ere in a quar	tz crystal, if there are 18 faces and 14	
Part	(1)	30	(2)	15	
	(3)	55	(4)	None of these	
25. The constant 'α' of a transistor is 0.95 collector-current corresponding to a ch in a common-emitter arrangement ?					
25.	COIL	ector-current corresp	onding to a	change of 0.4 mA in the base summent	
25.	in a	ector-current corresp	onding to a	change of 0.4 mA in the base summent	
25.	in a	common-emitter arr	angement?	change of 0.4 mA in the base current	
25. 26.	in a (1) (3)	common-emitter arr 7.6 mA 19.0 mA	conding to a cangement? (2) (4)	change of 0.4 mA in the base current 15.2 mA None of the above	
	in a (1) (3)	ry temperature the	conding to a cangement? (2) (4)	change of 0.4 mA in the base current 15.2 mA	
	in a (1) (3) At a	ry temperature the	energy of th	change of 0.4 mA in the base current 15.2 mA None of the above e molecules of an ideal gas is :	
26.	in a (1) (3) At a (1) (3) One	common-emitter arr 7.6 mA 19.0 mA ny temperature the Only P.E. Both K.E. and P.E.	energy of th (2) (4) (2) (4) (2) (4)	15.2 mA None of the above e molecules of an ideal gas is : Only K.E.	
26.	in a (1) (3) At a (1) (3) One chan	7.6 mA 19.0 mA ny temperature the Only P.E. Both K.E. and P.E. kilogram of ice melts	(2) (4) energy of th (2) (4) (4) (4) at 0°C into	15.2 mA None of the above e molecules of an ideal gas is : Only K.E. None of these	

CPG-EE-2017-Physics-Code-B

(5)

Question No.		Quest			
28.	The contents of which memory degrade with every read operation?				
	(1) EAROM	(2)	PROM		
	(3) EPROM	(4)	All of the above		
29.	A system call is a method by w	which a	program makes a request to the :		
	(1) Input management	(2)	Output management		
	(3) Interrupt processing	(4)	Operating system		
30.	Which 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 hap	opens v	when two waves are :		
No. Comp	(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 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 :			
34.				
	(1) Arrive 180° out of phase			
L.ornin L.ornin	(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 ?			
i wol	(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 period of the pendulum if the length of its string were doubled, the 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.			

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Question No.	Questions				
49.	In the crystal structure of silicon we have :				
	(1) Electrovalent Bonding				
	(2) Covalent Bonding				
	(3) Co-ordinate bonding				
1	(4) Mixture of covalent and electrovalent bonding				
50.	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) $\lambda = 2d$				
1 m 1	(3) $\lambda \le 2d$ (4) $\lambda < 2d$ The separation between the first stokes and corresponding anti-stokes				
52.	The separation between the first stones and in the rotational constant lines of the rotational Raman spectrum in terms of the rotational constant B is : (1) 12 B (2) 6 B (3) 4 B (4) 2 B The classical electron radius is of the order of : (1) 10^{-8} cm (2) 10^{-11} cm (2) 10^{-13} cm (4) 10^{-15} cm				
	(3) 10 Cm				
53.	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				
54.	Nuclear forces are : (1) Gravitational attractive (2) Electrostatic repulsive (3) Long range and strong attractive (4) Short range and strong attractive				

CPG-EE-2017-Physics-Code-B

(10)

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)		
56.	The	e nuclear reaction :			
10-1-1	rep	$4_{1}H^{1} \rightarrow {}_{2}He^{4} + 2_{-1}e^{0} + 26$ resents	6 MeV		
	(1)	Fusion	(2)	Fission	
1	(3)	β-decay		y-decay	
57.	rem	aining undecayed is :		s 4 days. After 20 days, the fraction	
	(1)	32	(2)	$\frac{1}{20}$	
	(3)	1 16	(4)	$\frac{1}{8}$	
58.	The	sun releases energy by :			
	(1)	Nuclear Fission	(2)	Nuclear Fusion	
	(3)	Spontaneous Combustion	(4)		
59.	The aton	particle which most easi		netrates through the nucleus of the	
	(1)	Neutron	(2)	Electron	
	(3)	Proton	(4)	Alpha particles	
60.	Whie	ch of the following reactior	ı forbi		
	(1)	$\mu^- \rightarrow e^- + \nu_{\mu} + \overline{\nu}_e$	(2)	$\pi^+ \rightarrow \mu^+ + \nu_{\mu}$	
	(3)	$\pi^+ \rightarrow e^+ + \nu_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$	

(11)

uestion No.	Questions				
61.	The electric field at the centre of a uniformly charged conductor is :				
	(1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$				
	(3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$				
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 $+ 0.7 V$				
	(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				
as g	(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) $\frac{\sqrt{3} C}{2}$ (4) $\sqrt{\frac{3}{2}} C$				
39. 7	The first law of thermodynamics is the conservation of :				
	(1) Momentum (2) Energy				
((3) Both (1) and (2) (4) None of these				

CPG-EE-2017-Physics-Code-B

Question No.	Questions				
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) $\frac{1}{kT} = \frac{\partial \Omega}{\partial E}$ (4) $\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$				
71.	The first thermodynamic law is conservation of :				
	(1) Momentum (2) Energy				
	(3) Both (4) None of these				
72.	Energy in a stretched wire is :				
	(1) $\frac{1}{2}$ (load × extension) (2) Load × strain				
	(3) Stress × strain (4) $\frac{1}{2}$ (Stress × strain)				
73.	Which of the following set of Maxwell's relation is correct ? (U – Internal energy, G – Gibb's energy, H – enthalpy and F – Helmholtz free energy)				
	(1) $T = \left(\frac{\partial U}{\partial V}\right)_{S}$ and $P = \left(\frac{\partial U}{\partial S}\right)_{V}$ (2) $V = \left(\frac{\partial H}{\partial P}\right)_{S}$ and $T = \left(\frac{\partial H}{\partial S}\right)_{P}$				
	(3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_S$ (4) $P = \left(\frac{\partial F}{\partial S}\right)_T$ and $S = \left(\frac{\partial F}{\partial P}\right)_V$				
74.	Pauli's exclusive principles is applicable to :				
	(1) M.B. (2) F.D.				
	(3) B.E. (4) None of these				

CPG-EE-2017-Physics-Code-B

(14)

Question No.	Questions
75.	The root mean square speed V _{rms} is :
	(1) $\left(\frac{8 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}}$ (2) $\left(\frac{2 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}}$
	(3) $\left(\frac{2 \mathrm{kT}}{\mathrm{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \mathrm{kT}}{\mathrm{m}}\right)^{\frac{1}{2}}$
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
. 3	(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) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$

CPG-EE-2017-Physics-Code-B

(15)

Question No.		Quest	
80.	Which of the following magnets:	aterials	is used for making permanent
	(1) Platinum Cobalt	(2)	Alnico V
	(3) Carbon steel	(4)	All of the above
81.	The ionization potential of hydrony to remove an electron from t	lrogen a he 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 Germer experi	iment re	elates to :
	(1) Interference	(2)	Electron diffraction
	(3) Polarization	(4)	Quantization
83.	The degree of degeneracy for oscillator are :	or 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)	(4)	2n + 1
84.	The de-Broglie hypothesis i	s associ	ated with :
	(1) Wave nature of electro	ons	
	(2) Wave nature of α -part	icles	
	(3) Wave nature of radiati	ion	
1	(4) Wave nature of all mat	terial pa	articles

CPG-EE-2017-Physics-Code-B

Code-B

Question No.	Questions
85.	A particle is confined to the region $0 < x < L$, in one dimension. If th 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 :
int i	(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. 1 s	No two electrons will have all the four quantum numbers equal. The tatement is called :
(1) Pauli exclusion principle (2) Uncertainty principle
(3) Hund's rule (4) Aufbau's principle

CPG-EE-2017-Physics-Code-B

CENS.

P.T.O.

(17)

Code-B

No. ·		Questi	
90.	The radius of a hydrogen atom	is in i	ts ground state is :
- ingitie	(1) 10^{-4} cm	(2)	10 ⁻⁶ cm
	(3) 10^{-8} cm	(4)	10 ⁻¹⁰ cm
91.	A floating point number consis	sts of :	and the second se
	(1) Mantissa only	(2)	Base only
	(3) An exponent	(4)	All of the above
92.	The chief reason why digital co	omput	ers use complemental subtraction is :
	(1) Simplifies their circuitary	у	Marine States and the set
	(2) Is a very simple process		le font i that the second
	(3) Can handle negative num	bers e	asily
	(4) Avoids direct subtraction		
93.	The Fourier transform of pr given by :	roduct	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 of signal has one of the followin	a Fou g sym	rier transform of a real-valued time metry :
	(1) NO	(2)	ODD
	(3) EVEN	(4)	CONJUGATE
95.	Mass of 700 N man moving i	n a car	r at 66 km h ⁻¹ is :
	(1) 70 kg	(2)	
a series	(3) Infinite	(4) Zero

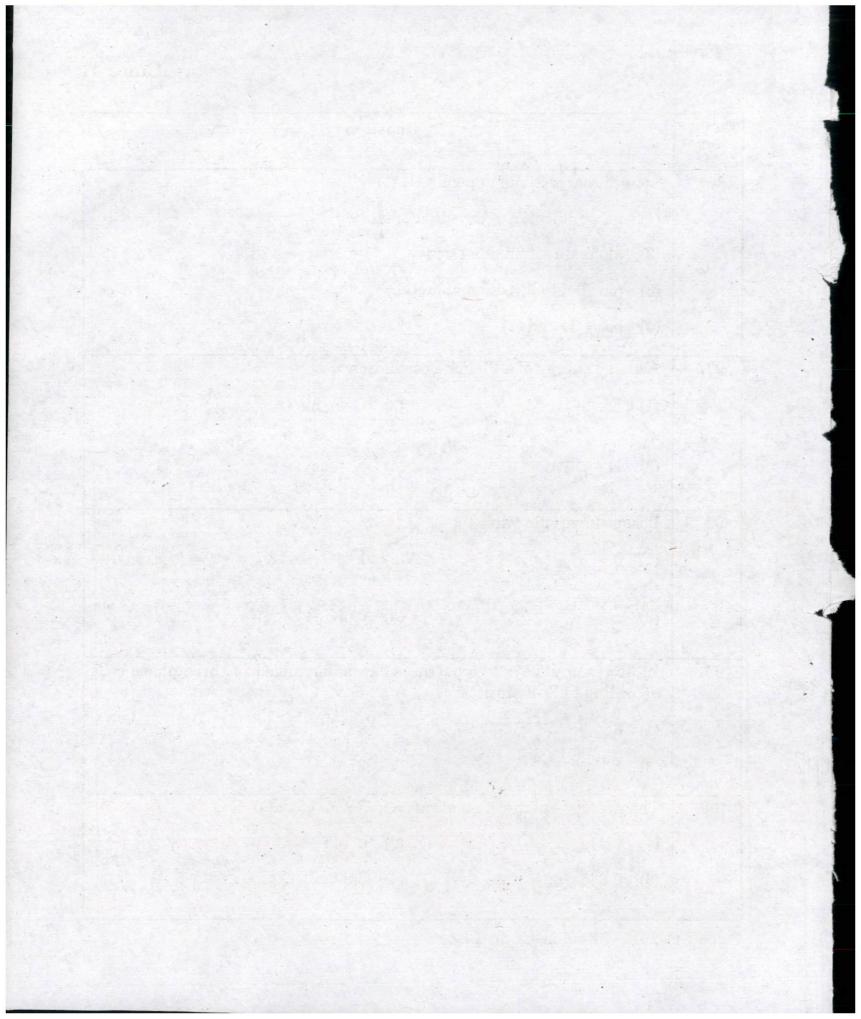
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Code-B

Question No.	Service and Martinette	Quest	tions
96.	Length contraction happen	s only :	
	(1) perpendicular to direct	tion of m	otion
	(2) along direction of moti	on	
	(3) parallel to direction of	motion	
	(4) both (1) and (2)		
97.	Average energy of a Planck	's oscillat	ion is :
	(1) $E = hv$	(2)	E = n hv
	(3) $E = \frac{hv}{(e^{hv/kT} - 1)}$	(4)	$E = mc^2$
98.	Bosons have spin value :		
	(1) 0	(2)	1
	(3) $\frac{1}{2}$	(4)	0 or 1
99.	In how many ways two pa according to B–E statistics		an be arranged in three phase cells
	(1) 6	(2)	9
	(3) 3	(4)	27
100.	The average energy of an e	lectron in	Fermi gas at 0° K is
	(1) 0.24 f	(2)	0.44 f
	(3) 0.64 f	(4)	0.8 f
	and the state of the second second		

CPG-EE-2017-Physics-Code-B



(Total No. of printed pages : 20)

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

(CPG-EE-2017) Subject : PHYSICS

Code C			10955 Sr. No
			SET-"A"
Time: 1½ Hours	Total Qu	estions : 100	Max. Marks : 100
Roll No	(in figure)		(in words)
Name :			
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.

- 1. 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.
- 3. 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.
- 4. 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 <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
- 6. There will be <u>Negative</u> marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

7. 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. Used for justice vertication 10955

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Question No.	Questions
1.	The electric field at the centre of a uniformly charged conductor is :
	(1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$
	(3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$
2.	The time base of a CRO is developed by :
1	(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
1.10	(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
1.4.1	(2) More negative than the anode
	(3) At $+ 0.7 V$
	(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) $\frac{p^2}{2x} - V(x)$

(1)

CPG-EE-2017-Physics-Code-C

Question No.		Quest	ions
6.	How many degree of freed	lom a rigid	body possess :
	(1) 3	(2)	6
	(3) 9	(4)	Infinite
7.	When a cylinder rolls down of freedom it has :	n without s	lipping on a plane, how many degrees
	(1) 1	(2)	2
	(3) 3	(4)	4
8.	The mass of electron is do is :	ouble 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 thermody	namics is t	the conservation of :
	(1) Momentum	(2)	Energy
	(3) Both (1) and (2)	(4)	None of these
10.	In statistical physics, the to the total number of acc		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)	$\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$

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Question No.			Ques	stions		
11.	The line B is	es of the rotational Raman s	first s spectr	tokes and corresponding anti-stokes um in terms of the rotational constant		
	(1)	12 B	(2)	6 B		
		4 B	(2) (4)	2 B		
12.	The	e classical electron 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 attraction b etrons of the other is called		en the nucleus of one atom and the		
(1-)	(1)	Coulomb forces	(2)	Gravitational		
	(3)	Strong forces	(4)	van der Waals forces		
14.	Nuclear forces are :					
334.1	(1)	Gravitational attractive				
	(2) Electrostatic repulsive					
	(3)	Long range and strong at	tractiv	ve		
	(4)	Short range and strong a	ttract	ive		
15.	201	maximum energy of deute MeV. The maximum energy elerator is :	eron co y of pr	oming from a cyclotron accelerator is otons that can be obtained from this		
	(1)	10 MeV	(2)	20 MeV		
	(3)	30 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				
	(1)	Fusion	(2)	Fission		
1.1.1	(3)	β-decay	(4)	γ-decay		

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(3)

Question No.		(Quest	tions	
17.	Half life of a radioactive material is 4 days. After 20 days, the fraction remaining undecayed is :				
	(1)	$\frac{1}{32}$	(2)	$\frac{1}{20}$	
	(3)	$\frac{1}{16}$	(4)	$\frac{1}{8}$	
18.	The	sun releases energy by :			
	(1)	Nuclear Fission	(2)	Nuclear Fusion	
1.1.1	(3)	Spontaneous Combustion	(4)	Hydro-thermal process.	
19.		particle which most easily n is :	y per	netrates through the nucleus of the	
	(1)	Neutron	(2)	Electron	
N. M. S.	(3)	Proton	(4)	Alpha particles	
20.	Whi	ch of the following reaction	forb	idden ?	
	(1)	$\mu^- \rightarrow e^- + \nu_{\mu} + \overline{\nu}_e$	(2)	$\pi^+\!\rightarrow\!\mu^++\nu_\mu$	
7.5	(3)	$\pi^+ \rightarrow e^+ + \nu_e$	(4)	$\mu^- \rightarrow e^+ + e^- + e^-$	
21.	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	
22.	Dav	risson and Germer experim	ent r	elates to :	
	(1)	Interference	(2)	Electron diffraction	
	(3)	Polarization	(4)	Quantization	

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(4)

No.	Questions				
23.	The degree of degeneracy for the three dimensional isotropic harmoni 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				
10 A. A.	(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 particle is in the first excited state, then the probability of findi- particle is maximum at :	. If the			
25.	particle is in the first excited state, then the probability of findi	. If the ing the			
25.	particle is in the first excited state, then the probability of findiparticle is maximum at :	. If the ing the			
25.	particle is in the first excited state, then the probability of findi- particle is maximum at : (1) $x = \frac{L}{2}$ (2) $x = \frac{L}{3}$	ing the			
26.	particle is in the first excited state, then the probability of findi- 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 $\frac{3L}{4}$	ing the			

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Question No.	(Quest	tions		
27.	The densest part of a probabil to :	ity cl	oud occurs at a radius proportional		
	(1) n	(2)	n ²		
	(3) n ³	(4)	n ⁴		
28.	The de-Broglie wavelength λ fo	r an	electron of energy 150 eV is :		
	(1) 10^{-8} m	(2)	10 ⁻¹⁰ m		
	(3) 10 ⁻¹² m	(4)	10 ⁻¹⁴ m		
29.	No two electrons will have all statement is called :	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.	According to which statistics, zero?	, the	energy at absolute zero can not be		
	(1) M – B	(2)	B-E		
	(3) $F - D$	(4)	None of these		
32.	In a grand canonical ensemble with a large reservoir B. Then		ystem A of fixed volume is in contac		
	(1) A can exchange only energy with B				
	(2) A can exchange only parti	icles	with B		
	(3) A can exchange neither en	nergy	nor particle with B.		
	(4) A can exchange both ener	gy ar	nd particles with B.		

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Question No.			Ques	tions
33.		a micro canonical h a large reservoi		vstem A of fixed volume is in contact
	(1)	A can exchange	only energy wit	ch B
	(2)	A can exchange	only particles v	vith B.
	(3)	A can exchange	neither energy	nor particles with B.
	(4)	A can exchange	both energy an	d particles with B.
34.		quantum statist dition :	ics reduces to c	lassical statistics under the following
	(1)	$\rho A^{3} = 1$	(2)	ρ A ³ >> 1
	(3)	$\rho A^3 << 1$	(4)	ρ=0
35.	A co 0.12 (1)	ppper wire is of le 2 Ω at 20°C. Its co 5.89×10^7 ohm ⁻	onductivity (σ) v	diameter 0.3 mm has a resistance of vill be :
		5.89×10^9 ohm ⁻ 5.89×10^5 ohm ⁻ None of the abo	¹ m ⁻¹ ¹ m ⁻¹	
36.	(3) (4) The to:	5.89 × 10 ⁹ ohm ⁻ 5.89 × 10 ⁵ ohm ⁻ None of the abo mobility of charge	¹ m ⁻¹ ¹ m ⁻¹ ve	ntrinsic semiconductor is proportional
36.	(3) (4) The to:	5.89×10^9 ohm ⁻ 5.89×10^3 ohm ⁻ None of the abo	¹ m ⁻¹ ¹ m ⁻¹ ve	ntrinsic semiconductor is proportional $T^{\frac{3}{2}}$
36.	(3) (4) The to:	5.89 × 10 ⁹ ohm ⁻ 5.89 × 10 ⁵ ohm ⁻ None of the abo mobility of charge	¹ m ⁻¹ ¹ m ⁻¹ ve e carriers in an i	
36.	 (3) (4) The to : (1) (3) An e 	5.89×10^9 ohm ⁻ 5.89×10^3 ohm ⁻ None of the abo mobility of charge $T^{\frac{1}{2}}$ $\frac{1}{T^2}$	¹ m ⁻¹ ¹ m ⁻¹ ve e carriers in an i (2) (4) and a proton hav	$T^{\frac{3}{2}}$ $\frac{1}{T^{\frac{3}{2}}}$
	 (3) (4) The to : (1) (3) An e 	5.89×10^9 ohm ⁻ 5.89×10^5 ohm ⁻ None of the abo mobility of charge $T^{\frac{1}{2}}$ $\frac{1}{T^2}$	¹ m ⁻¹ ¹ m ⁻¹ ve e carriers in an i (2) (4) and a proton hav	T ^{3/2}

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P.T.O.

(7)

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	(1) Momentum (2) Energy				
	(3) Both (4) None of these				

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Question No.	Questions Energy in a stretched wire is :				
42.					
	(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 energy, G – Gibb's energy, H – enthalpy and F – Helmholtz fre				
	(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) $\left(\frac{3 \text{ kT}}{\text{m}}\right)^{\frac{1}{2}}$				

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Question No.	Questions				
46.		en ice melts and bec nge such that :	ome water,	the ice – water system undergoes a	
	(1)	Entropy decreases a	and internal	energy increases	
	(2)	Entropy increases t	he internal	energy decreases	
	(3)	Entropy and Intern	al energy of	the system increases	
	(4)	Entropy and Intern	al energy of	the system decreases	
47.				nd distinguishable particles of spin 1 entropy of system is :	
	(1)	$2 k_b \ell n 2$	(2)	3 k _b ln 3	
	(3)	N k _b ℓ n 2	(4)	N k _b ln 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)	$\vec{\nabla} \cdot \vec{E} = \frac{\pi}{\epsilon_0}$	(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.	10 C C C C C C C C C C C C C C C C C C C	ich of the followin gnets:	ig material	s is used for making permanent	
	(1)	Platinum Cobalt	(2)	Alnico V	
	(3)	Carbon steel	(4)	All of the above	

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(10)

Questions				
Cho	oose the particle with zer	o Baryo	n number from the list given below :	
(1)	Pion	(2)	Neutron	
(3)	Proton	(4)	Δ*	
Hov	w many atoms per unit c	ell are ir	hcp structure :	
(1)	1	(2)	2	
(3)	4	(4)	6	
The	one which is not compat	tible wit	h crystal symmetry is :	
(1)	One-fold symmetry	(2)	Three-fold symmetry	
(3)	Five-fold symmetry	(4)	Six-fold symmetry	
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%	
The reciprocal lattice of a simple cubic lattice is :				
(1)	Monoclinic	(2)	Triclinic	
(3)	Cubic	(4)	Orthorhombic	
			weight-M), for unit mass is C_v . Its	
· (1)	C _v /M	(2)	M/C _v	
(3)	MC _v	(4)	C _v	
	 (1) (3) Hov (1) (3) The (1) (3) The (1) (3) The (1) (3) The (1) (3) 	(1) Pion (3) Proton How many atoms per unit c (1) 1 (3) 4 The one which is not compate (1) One-fold symmetry (3) Five-fold symmetry (3) Five-fold symmetry (1) 74% (3) 52% The reciprocal lattice of a si (1) Monoclinic (3) Cubic The specific heat of a solid atomic specific heat of a solid atomic specific heat of a solid atomic specific heat of a solid	Choose the particle with zero Baryon(1)Pion(2)(3)Proton(4)How many atoms per unit cell are in(1)1(1)1(2)(3)4(4)The one which is not compatible with(1)(1)One-fold symmetry(2)(3)Five-fold symmetry(2)(3)Five-fold symmetry(2)(1)74%(2)(3)52%(4)The reciprocal lattice of a simple cull(1)Monoclinic(2)(3)Cubic(4)The specific heat of a solid (atomic atomic specific heat C_y will be :(1) C_y/M (2)	

(11)

Question No.	Questions					
57.	The relationship between th frequency v_E is :	e Einst	tien's temperature $(\theta)_{E}$ and Einstien			
	(1) $(\theta)_{\rm E} = \frac{\rm h v_{\rm E}}{\rm k}$	(2)	$(\theta)_{\rm E} = \frac{{\rm v}_{\rm E}}{{\rm h}{\rm k}}$			
	(3) $v_E = \frac{h(\theta)_E}{k}$	(4)	$v_{E} = \frac{h k}{(\theta)_{E}}$			
58.	For all metals, the ratio of conductivity is directly propo		ermal conductivity to the electrical to :			
	(1) T	(2)	T^2			
in the second	(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			
Contraction of the	(3) Ferromagnetic property	(4)	Diamagnetic property			

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No.	n Questions					
62.	A magnetic material has magnetization of 3200 A/m and flux density 0.005 webers/m ² . Its magnetization force is :					
	(1)	780.9 A/m	(2)	1560.1 A/m		
	(3)	390.0 A/m	(4)	None of the above		
63.	The	e unit of dipole mom	ent is :	A State of the second		
	(1)	Coulomb	(2)	Coulomb-metre		
	(3)	Metre / coulomb	(4)	Coulomb-metre ²		
64.	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 ?					
65.	coll	ector-current corres	ponding to a	change of 0.4 mA in the base current		
65.	coll	ector-current corres	ponding to a	change of 0.4 mA in the base current		
65.	coll in a	ector-current corres common-emitter ar	ponding to a rrangement ?	change of 0.4 mA in the base current		
65. 66.	coll in a (1) (3)	ector-current corres common-emitter ar 7.6 mA 19.0 mA	ponding to a rangement ? (2) (4)	change of 0.4 mA in the base current 15.2 mA		
	coll in a (1) (3)	ector-current corres common-emitter ar 7.6 mA 19.0 mA	ponding to a rangement ? (2) (4)	change of 0.4 mA in the base current 15.2 mA None of the above		
	coll in a (1) (3) At a	ector-current corres common-emitter ar 7.6 mA 19.0 mA any temperature the	ponding to a rangement ? (2) (4) e energy of th (2)	change of 0.4 mA in the base current 15.2 mA None of the above e molecules of an ideal gas is :		
	coll in a (1) (3) At a (1) (3) One	ector-current corres common-emitter an 7.6 mA 19.0 mA any temperature the Only P.E. Both K.E. and P.E.	ponding to a rangement ? (2) (4) e energy of th (2) (4)	change of 0.4 mA in the base current 15.2 mA None of the above e molecules of an ideal gas is : Only K.E. None of these		
66.	coll in a (1) (3) At a (1) (3) One	ector-current corres common-emitter ar 7.6 mA 19.0 mA any temperature the Only P.E. Both K.E. and P.E.	ponding to a rangement ? (2) (4) e energy of th (2) (4)	change of 0.4 mA in the base current 15.2 mA None of the above e molecules of an ideal gas is : Only K.E.		

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Question No.			tions			
68.	The contents of which memory degrade with every read operation ?					
	(1)	EAROM	(2)	PROM		
	(3)	EPROM	(4)	All of the above		
69.	A sy	stem call is a method by w	which a	a program makes a request to the :		
1500	(1)	Input management	(2)	Output management		
1.5	(3)	Interrupt processing	(4)	Operating system		
70.	Wh	ich of the following is inval	id in F	'ORTRAN ?		
	(1)	$P + Q + \cdots$	(2)	DO 100001 = 1, 5		
1212	(3)	DIMENSION × (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 :					
Contraction of the	(1) Simplifies their circuitary					
	(2) Is a very simple process					
	(3) Can handle negative numbers easily					
· · · ·	(4)	Avoids direct subtraction	1			
73.	The Fourier transform of product of two time functions $[f_1(t) f_2(t)]$ is given by :					
	(1)	$[f_1(w) + f_2(w)]$	(2)	$[f_1(w) / f_2(w)]$		
	(3)	$[f_1(w) * f_2(w)]$	(4)	$[f_1(w) \times f_2(w)]$		
74.	The magnitude spectrum of a Fourier transform of a real-valued time signal has one of the following symmetry :					
	.(1)	NO	(2)	ODD		
	(3)	EVEN	(4)	CONJUGATE		

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

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Question No.	Questions				
81.		maximum number of aber ℓ is :	f electrons	in a sub-shell with orbital quantum	
	(1)	$2\ell + 1$	(2)	$2\ell - 1$	
	(3)	$2(2\ell + 1)$	(4)	$2(2\ell - 1)$	
82.	Ato	ms with $\frac{1}{2}$ nuclear spi	in can not l	nave :	
	(1)	Hyperfine structure	(2)	Electric dipole interaction	
	(3)	Fine structure	(4)	None of these	
83.	The	e average binding ener	gy of a nuc	eleon in a nucleus of the atom is :	
	(1)	8 eV	(2)	80 eV	
	(3)	8 MeV	(4)	$80\mathrm{MeV}$	
84.	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 $\sqrt{3 \text{ ka}}$	(2)	$ma^2 \sqrt{ka}$	
	(3)	$ma^2 \sqrt{3ka}$	(4)	ma √ka	
85.	The	e Lande g-factor for th	ne ³ P ₁ level	of an atom is :	
	(1)	$\frac{1}{2}$	(2)	$\frac{3}{2}$	
	(3)	5	(4)	7	

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(16)

Question No.	Questions					
86.	If 50 kV is applied potential in an X-ray tube, then the minimum wave- length of X-rays produced is :					
	(1)	0.2 nm	(2)	2 nm		
	(3)	0.2 A	(4)	2 A°		
87.		ording to Moseley's law iation is proportional to tl		equency of the characteristic X-ray are of :		
	(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.	Constructive interference happens when two waves are :					
	(1)	Out of phase	(2)	Zero amplitude		
	(3)	Inphase	(4)	In front		

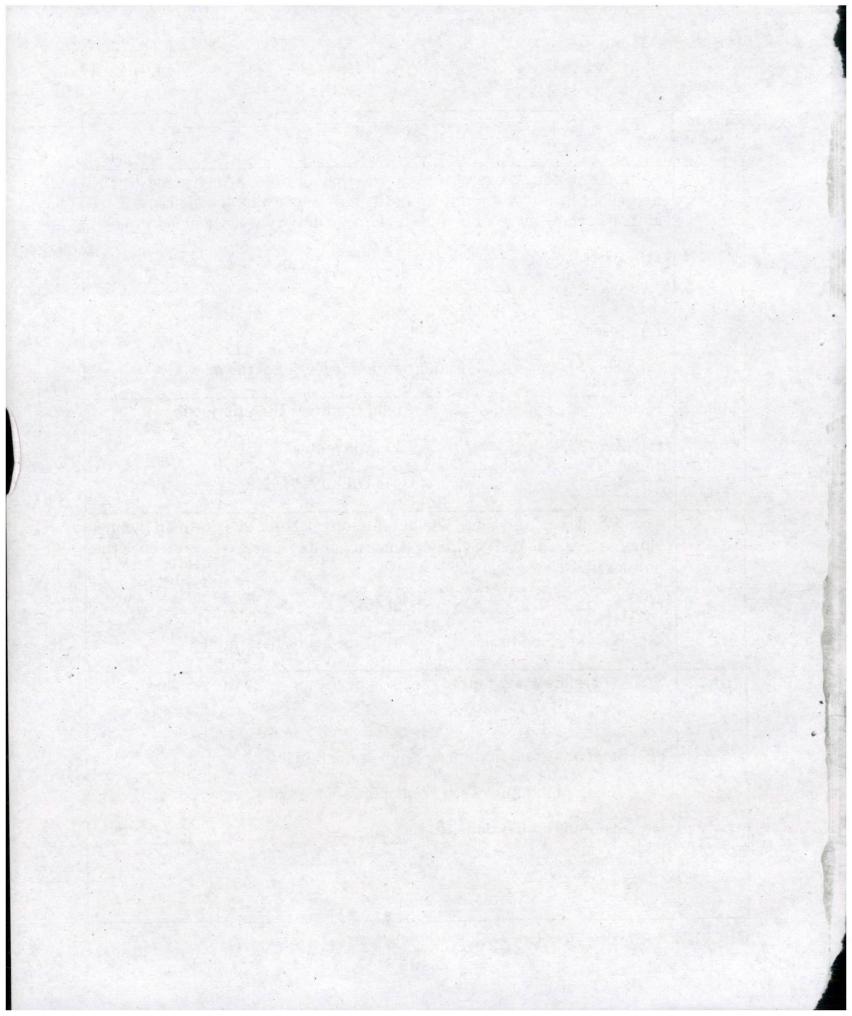
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Question No.	n Questions					
92.	What principle is responsible for the fact that certain sunglasses car reduce glare from reflected surfaces ?					
	(1)	Refraction	(2)	Polarization		
	(3)	Diffraction	(4)	Total internal reflection		
93.	frir	ht of wavelength 5 nge is seen at an an able slits ?	75 nm falls or gle of 6.5 deg	n a double-slit and third order bright rees. What is the separation betweer		
	(1)	5.0 µm	(2)	10 µm		
	(3)	15 µm	(4)	20 µm		
		Travel paths must	bhase t differ by a w	hole number of wavelengths dd 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		
100	(3)	Independent of k	(4)	Constantly changing		
96.	Whi	ich of the following	is equivalent	to a unit of momentum ?		
	(1)	Newton-meter	(2)	Newton-Second		
	(3)	Joule-Second	(4)	None of the above		

CPG-EE-2017-Physics-Code-C

Questions					
 period of the pendulum i of its bob were cut in hal (1) 0.5 S (2) 1.5 S (3) 3 sec. 	ings with a period of 1.5 s. What would be the if the length of its string were doubled, the mass lf, and the force of gravity were doubled ? ent 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 bottom first ?					
(1) A	(2) B				
(3) Both at same time	(4) Can not be determined				
 (1) Steel is cheaper (2) Steel has greater van 	aking springs over copper for the reason : alue of Young's modulus 'copper is more than steel nsity				
	 period of the pendulum is of its bob were cut in hall (1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient (1) Zero (3) 1 Two cylinders of the same starting from the rest. Cylinders of the same starting from the rest. Cylinders? (1) A (3) Both at same time Steel is preferred for mate (1) Steel is cheaper (2) Steel has greater valors (3) Young's modulus of 				

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10956

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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 1 0.0	magnetic material has mag 05 webers/m². Its magnetiz	gneti: ation	zation of 3200 A/m and flux density force is :
67.15	(1)	780.9 A/m	(2)	1560.1 A/m
1.4/1 4	(3)	390.0 A/m	(4)	None of the above
3.	The	e unit of dipole moment is :		
	(1)	Coulomb	(2)	Coulomb-metre
	(3)	Metre / coulomb	(4)	Coulomb-metre ²
4.	How	w many edges are there in a cles in it :	quar	tz crystal, if there are 18 faces and 14
	(1)	30	(2)	15
	(3)	55	(4)	None of these
5.	COII	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	ofth	e molecules of an ideal gas is :
	(1)	Only P.E.	(2)	Only K.E.
0.	(1)			

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(1)

Question No.			Ques	tions	
7.	One kilogram of ice melts at 0°C into water at the same temperature. The change in entropy is :				
	(1)	0	(2)	Infinite	
	(3)	0.293	(4)	293	
8.	The	contents of which memory	y degr	ade with every read operation ?	
	(1)	EAROM	(2)	PROM	
1.00	(3)	EPROM	(4)	All of the above	
9.	Asy	ystem call is a method by v	which a	a program makes a request to the :	
	(1)	Input management	(2)	Output management	
1	(3)	Interrupt processing	(4)	Operating system	
10.	Wh	ich of the following is inval	id in F	'ORTRAN ?	
	(1)	P + Q +	(2)	DO 100001 = 1, 5	
	(3)	DIMENSION × (30, 20)	(4)	CONTINUE	
11.	Cor	structive interference hap	pens v	vhen two waves are :	
	(1)	Out of phase	(2)	Zero amplitude	
	(3)	Inphase	(4)	In front	
12.	What principle is responsible for the fact that certain surreduce glare from reflected surfaces ?				
	(1)	Refraction	(2)	Polarization	
	(3)	Diffraction	(4)	Total internal reflection	
13.	friņ			n a double-slit and third order bright rees. What is the separation between	
	(1)	5.0 µm	(2)	10 µm	
2.3.1	(3)	15 µm	(4)	20 µm	

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Question No.			Ques	stions
14.	the	vo beams of coherent l e maximum construct ams must :	ight travel tive interfe	different paths arriving at point P. If rence is to occur at point P, the two
	(1)	Arrive 180° out of p	hase	
	(2)	Arrive 90° out of ph	ase	a subsequences
	(3)	Travel paths must d	liffer by a w	hole number of wavelengths
	(4)	Travel paths that di	iffer by an o	dd number of half-wavelengths
15.	fore	ce i proportional to t	he speed v o	armonic oscillation with period T_0 . A of the particle, $f = -kv$, is introduced. , the period with f acting is :
1.1.1	(1)	Larger than T_0	(2)	Smaller than T ₀
	(3)	Independent of k	(4)	Constantly changing
16.	Wh	ich of the following is	equivalent	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 i	f the length	period of 1.5 s. What would be the of its string were doubled, the mass prce of gravity were doubled ?
	1.	0.5 S		
·	(2)	1.5 S		
	(3)	3 sec.		
Sec.	(4)	There is not sufficien	nt informat	ion to estimate the answer.
18.	If th	ne force is applied at t	the centre o	of the mass then torque is :
	(1)	Zero	(2)	Maximum

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Question No.			Quest	ions	
19.	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)	А	(2)	В	
	(3)	Both at same time	(4)	Can not be determined	
20.	Stee	el is preferred for mak	ing spring	s over copper for the reason :	
19. 11.	(1)	Steel is cheaper			
1.00	(2)	Steel has greater val	ue of Youn	g's modulus	
	(3)	Young's modulus of o	copper is m	ore than steel	
	(4)	Steel has higher den	sity		
21.	Choose the particle with zero Baryon number from the list given below :				
19.3	(1)	Pion	(2)	Neutron	
	(3)	Proton	(4)	Δ*	
22.	Hov	w many atoms per uni	t cell are ir	hcp structure :	
	(1)	1	(2)	2	
ever 1	(3)	4	(4)	6	
23.	The	e one which is not com	patible 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 vic lattice is :	f atoms to t	he total volume available in a simple	
	(1)	74%	(2)	66%	
	(3)	52%	(4)	84%	

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(4)

Question No.		Ques	tions		
25.	The reciprocal lattice of a simple cubic lattice is :				
	(1) Monoclinic	(2)	Triclinic		
	(3) Cubic	(4)	Orthorhombic		
26.	The specific heat of a soli atomic specific heat C_v will	d (atomic l be :	weight-M), for unit mass is C_v . Its		
	(1) C _v /M	(2)	M/C _v		
	(3) MC _v	(4)	C _v		
27.	The relationship between frequency v_E is :	the Einsti	en's temperature $(\theta)_{E}$ and Einstien		
	(1) $(\theta)_{\rm E} = \frac{\rm h v_{\rm E}}{\rm k}$	(2)	$\left(\theta\right)_{\rm E} = \frac{{\rm v}_{\rm E}}{{\rm h}{\rm k}}$		
	(3) $v_E = \frac{h(\theta)_E}{k}$	(4)	$\mathbf{v}_{\mathrm{E}} = \frac{\mathrm{h}\mathrm{k}}{(\theta)_{\mathrm{E}}}$		
28.	For all metals, the ratio o conductivity is directly prop	of the then portional t	mal conductivity to the electrical o:		
	(1) T	a de la sege	Γ^2		
	(3) The inverse of T	(4)	Inverse of T ²		
29.	In the crystal structure of s	ilicon we ł	lave :		
	(1) Electrovalent Bonding				
	(2) Covalent Bonding				
	(3) Co-ordinate bonding				
. ((4) Mixture of covalent and	l electrova	lent bonding		

(5)

uestion No.	Questions
30.	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) $\lambda < 2d$
31.	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) $2(2\ell-1)$
32.	Atoms with $\frac{1}{2}$ nuclear spin can not have :
	(1) Hyperfine structure (2) Electric dipole interaction
	(3) Fine structure (4) None of these
33.	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
34.	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) $ma \sqrt{ka}$

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(6)

Question No.			Que	stions
35.	The	e Lande g-factor for the	e ³ P ₁ level	of an atom is :
	(1)	$\frac{1}{2}$	(2)	<u>3</u> 2
	(3)	$\frac{5}{2}$	(4)	$\frac{7}{2}$
36.	If 5 leng	0 kV is applied potenti gth of X-rays produced	ial in an X is :	K-ray tube, then the minimum wave
	(1)	0.2 nm	(2)	2 nm
	(3)	0.2 A	(4)	2 A°
37.	rad	iation is proportional to	o the squa	equency of the characteristic X-ray
	 (1) (2) (3) (4) 	Atomic weight of the of Atomic number of the Both (1) and (2) None of these		
38.	 (2) (3) (4) 	Atomic number of the Both (1) and (2)	element	ne result of :
38.	 (2) (3) (4) 	Atomic number of the Both (1) and (2) None of these	element	ne result of : Inverse photoelectric effect
38.	 (2) (3) (4) The 	Atomic number of the Both (1) and (2) None of these continuous X-ray spec	element trum is tl	
	 (2) (3) (4) The (1) (3) 	Atomic number of the Both (1) and (2) None of these continuous X-ray spec Photoelectric effect Compton effect	element trum is th (2) (4)	Inverse photoelectric effect Auger effect
38.	 (2) (3) (4) The (1) (3) All y 	Atomic number of the Both (1) and (2) None of these continuous X-ray spec Photoelectric effect Compton effect	element trum is th (2) (4)	Inverse photoelectric effect

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Question No.	Questions						
40.	Semiconductor laser is made of :						
	(1)	Germanium	(2)	Silicon			
	(3)	GaAs based materials	(4)	Ruby crystal			
41.	Acc		s, the	energy at absolute zero can not be			
	(1)	M – B	(2)	B-E			
	(3)	$\mathbf{F} - \mathbf{D}$	(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 :						
Maril .	(1)	$\rho A^{3} = 1$	(2)	ρ A ³ >> 1			
4.7.24	(3)	ρ A ³ << 1	(4)	$\rho = 0$			

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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 :					
See. 1	(1) $5.89 \times 10^7 \text{ ohm}^{-1} \text{ m}^{-1}$					
Par San	(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 proportiona					
Con Cal	to :					
	(1) $T^{\frac{1}{2}}$ (2) $T^{\frac{3}{2}}$ (3) $\frac{1}{T^2}$ (4) $\frac{1}{T^{\frac{3}{2}}}$					
	(3) $\frac{1}{1}$ (4) $\frac{1}{1}$					
1	(3) T^2 (4) $T^{3/2}$					
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 :					
Cloud	(1) Converging lens are used					
- Aller	(2) Converging mirror is used					
	(3) Diverging mirror is used					
2	(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					
	(3) Both real and imaginary parts of the complex dielectric constant(4) Square root of the real part of the complex dielectric constant.					

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Question No.			Quest	tions		
50.	The	diamagnetic susceptibility	is:	Carl State of Lands		
	(1)	Positive always				
	(2)	Negative always				
	(3)	Zero always		and the second sec		
	(4)	All are false				
51.	The	first thermodynamic law is	s cons	servation 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)	$T = \left(\frac{\partial U}{\partial V}\right)_{S} \text{ and } P = \left(\frac{\partial U}{\partial S}\right)_{V}$	(2)	$V = \left(\frac{\partial H}{\partial P}\right)_{S} \text{ and } T = \left(\frac{\partial H}{\partial S}\right)_{P}$		
1	(3)	$P = \left(\frac{\partial G}{\partial V}\right)_{T} \text{ and } V = \left(\frac{\partial G}{\partial P}\right)_{S}$	(4)	$P = \left(\frac{\partial F}{\partial S}\right)_{T} \text{ and } S = \left(\frac{\partial F}{\partial P}\right)_{V}$		
54.	Pau	uli's exclusive principles is a	applic	able to :		
	(1)	M.B.	(2)	F.D.		
	(3)	B.E.	(4)	None of these		

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(10)

Question No.	Questions				
55.	The root mean square speed $V_{\rm rms}$ is :				
	(1) $\left(\frac{8 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}}$ (2) $\left(\frac{2 \mathrm{kT}}{\pi \mathrm{m}}\right)^{\frac{1}{2}}$				
	(3) $\left(\frac{2 \mathrm{kT}}{\mathrm{m}}\right)^{\frac{1}{2}}$ (4) $\left(\frac{3 \mathrm{kT}}{\mathrm{m}}\right)^{\frac{1}{2}}$				
56.	When ice melts and become water, the ice – water system undergoes a change such that :				
	(1) Entropy decreases and internal energy increases				
in all	(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				
57.	In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is :				
125.2	(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 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) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$				

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P.T.O.

(11)

Question No.	Questions Which of the following materials is used for making permanent magnets:						
60.							
	(1)	Platinum Cobalt	(2)	Alnico V			
1.836	(3)	Carbon steel	(4)	All of the above			
61.	A fl	oating point number	consists of :				
	(1)	Mantissa only	(2)	Base only			
	(3)	An exponent	(4)	All of the above			
62.	The	chief reason why dig	ital comput	ers use complemental subtraction is :			
(sid	(1) Simplifies their circuitary						
Ener /	(2) Is a very simple process						
	(3) Can handle negative numbers easily						
	(4)	Avoids direct subtra	iction				
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)	$[f_1(w) / f_2(w)]$			
1.5	(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 :						
Sec. 2	(1)	NO	(2)	ODD			
	(3)	EVEN	(4)	CONJUGATE			
65.	Ma	ss of 700 N man movi	ng in a car	at 66 km h ⁻¹ is :			
	(1)	70 kg	(2)	100 kg			
1.5.3	(3)	Infinite	(4)	Zero			

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(12)

Question No.			Que	stions		
66.	Length contraction happens only :					
1. Serie	(1)	perpendicular	r to direction of n	notion		
	-(2)	along directio				
	(3)		ection of motion			
1	(4)	both (1) and (2	2)			
67.	Ave	erage energy of	a Planck's oscilla	tion is :		
	(1)	E = hv	(2)	E = n hv		
	(3)	$\mathbf{E} = \frac{h\nu}{(e^{h\nu/kT} - 1)}$	(4)	$E = mc^2$		
68.	Bos	ons have spin v	alue :	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -		
3	(1)		(2)	1	at an an an	
	(3)	<u>1</u>				
	(0)	2	(4)	0 or 1		
69.	In how many ways two particles can be arranged in three phase cells according to B-E statistics ?					
	(1)		(2)	9		
	(3)	3	(4)	27	" dan harrow	
70.	The average energy of an electron in Fermi gas at 0° K is					
		0.24 f	(2)	0.44 f	15	
	(3)	0.64 f		0.8 f		
71.	The electric field at the centre of a uniformly charged conductor is :					
1.1				5 80 u		
	(1)	$\frac{\mathrm{qr}}{4\pi\in_0\mathrm{R}^3}$	(2)	$\frac{q}{4\pi \in_0 r^2}$		
	(3)	Zero	(1)	$\frac{q}{4\pi\epsilon_0 R^2}$		

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(13)

uestion 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 $+ 0.7 V$						
	(4) Grounded						
75.	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) $\frac{x^2}{2x} + V(x)$						
i	(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						

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(14)

Question No.		Questions
77.	When a cylinder rolls down of freedom it has :	without slipping on a plane, how many degree
	(1) 1	(2) 2
	(3) 3	(4) 4
78.	The mass of electron is dou is :	ble its rest mass than the velocity of electror
	(1) $\frac{C}{2}$ (3) $\frac{\sqrt{3} C}{2}$	(2) 2C
	(3) $\frac{\sqrt{3} C}{2}$	(4) $\sqrt{\frac{3}{2}}$ C
79.	The first law of thermodyna	mics is the conservation of ·
	(1) Momentum	(2) Energy
	(3) Both (1) and (2)	(4) None of these
80.	In statistical physics, the ab to the total number of access	solute temperature T of a system is related sible state Ω as :
	(1) $kT = \frac{\partial \Omega}{\partial E}$	(2) $kT = \frac{\partial \log \Omega}{\partial E}$
	(3) $\frac{1}{kT} = \frac{\partial \Omega}{\partial E}$	(4) $\frac{1}{kT} = \frac{\partial \log \Omega}{\partial E}$
	The separation between the lines of the rotational Raman B is :	first stokes and corresponding anti-stokes spectrum in terms of the rotational constant
((1) 12 B	(2) 6 B
(3) 4 B	(4) 2 B

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(15)

uestion No.	Questions						
82.	The classical electron radius is of the order of :						
	(1) 1	0 ⁻⁸ cm	(2)	1	0 ⁻¹¹ cm		
	(-)	0 ⁻¹³ cm	(4)		0 ⁻¹⁵ cm		
83.	The electr	electrostatic attra ons of the other i	action betwee is called :	n	the nucleus of one atom and the		
	(1) (Coulomb forces	(2)	(Gravitational		
	(3)	Strong forces	(4)	1	van der Waals forces		
84.	Nucle	ear forces are :		for a constant			
	(1) Gravitational attractive						
6.4	(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))	$20\mathrm{MeV}$		
	(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						
1.10	(1)	Fusion	(2	()	Fission		
	(3)	β-decay	. (4)	y-decay		

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(16)

Question No.	Lilloctions						
87.	Half life of a radioactive material is 4 days. After 20 days, the fraction remaining undecayed is :						
	(1)	$\frac{1}{32}$	(2)	$\frac{1}{20}$			
	(3)	$\frac{1}{16}$	(4)	$\frac{1}{8}$			
88.	The	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.	Whi	ch of the following reaction	forb	idden ?			
	(1)	$\mu^- \! \rightarrow \! e^- \! + \nu_\mu + \overline{\nu}_e$	(2)	$\pi^+ \rightarrow \mu^+ + \nu_{\mu}$			
-	(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	(1)	27.0 eV			

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Questions					
Davisson and Germer exp	eriment re	elates to :			
(1) Interference	(2)	Electron diffraction			
(3) Polarization	(4)	Quantization			
The degree of degeneracy oscillator are :	for the th	nree dimensional isotropic harmonic			
(1) n ²	(2)	$\frac{1}{2}$ (2n + 1) (2n + 2)			
(3) $\frac{1}{2}$ (n + 1) (n + 2)	(4)	2n+1			
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					
A particle is confined to particle is in the first ex particle is maximum at :	the region cited state	x < x < L, in one dimension. If the e, then the probability of finding the			
(1) $x = \frac{L}{2}$	(2)	$x = \frac{L}{3}$			
(3) $x = \frac{L}{6}$	(4)	$x = \frac{L}{4}$ and $\frac{3L}{4}$			
	 Interference Polarization The degree of degeneracy oscillator are : n² 1 n² 1 (1) n² 1 (2) (n + 1) (n + 2) The de-Broglie hypothesis Wave nature of elected Wave nature of a c-pa Wave nature of radia Wave nature of all means of a particle is confined to particle is in the first expandice is maximum at : 	Davisson and Germer experiment regime (1) Interference (2)(3) Polarization (4)(3) Polarization (4)The degree of degeneracy for the throscillator are :(1) n^2 (2)(3) $\frac{1}{2}$ (n+1) (n+2) (4)The de-Broglie hypothesis is associated(1) Wave nature of electrons(2) Wave nature of α -particles(3) Wave nature of radiation(4) Wave nature of radiation(4) Wave nature of all material particle is in the first excited state particle is maximum at :(1) $x = \frac{L}{2}$ (2)			

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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					
	(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 proportionate 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					

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(19)

Keys prepared after Jumbling for diff. Codes with Corrections

DU	YSICS ENTRANC	E EXAM CEE-20	17 ANSWER KE	Y
Srl. No.	CODE-A	CODE-B	CODE-C	0000
1	1	3	3	4
2	32	2	1	1
3	3	3	1	× 2
4	4	3	1	1
5	4	2	1	1
6	2	3	2	2
7	2	2	2	4
8	2	2	3	1
9	1	2	2	4
10	3	3	4	1
10	3	3	<u>z 1</u>	3
11	2	4	3	2
12	3	3	4	3
15	3	2	4	3
14	2	1	1	1
15	3	4	1	12
10	2	. 3	1	2
17	2	4	2	1
18	2	2	1	3
20	3	2	4	2
20	× 1	4	1	1
21	3	1	82	4
22	4	× 2	3	3
23	4	1	4	3
24	1	1	4	3
the second se	1	2	2	3
26	1	4	2	1
	2	1	2	1
28 29	1	4	1	2
	4	1	3	3
30 31		3	3	3
	4	2	4	2
32	3	3	3	3
<u>33</u> 34	3	3	. 2	3
	3	1	1	2
35	3	12	4	3
36	1	2	3	2
37 38	1	1	4	2
38	2	3	2	2
	3	2	2	3
40	3	1	2	3
41	1	4	1	4
42	1	3	2	3
43	1	3	2	2
44	1	3	4	1
45	2	3	3	4
46	2	1	4	3
47	3	1	4	4
48	2	2	2	2
1 40	1 2	2	4	2

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keys with corrections

Srl. No.	CODE-A	CODE-B	CODE-C	CODE-D	
51	3	× 1	1	2	
52	2	3	4	1	
53	3	4	3	2	
54	3	4	3	2	
55	1	1	3	4	
56	42	1	3	3	
57	2	1	1	4	
58	1	2	1	4	
59	3	1	2	2	
60	2	4	3	4	
61	2	3	4	4	
62	1	1	1	1	
63	2	1	* 2	3	
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65	4	1	1	1	
66	3	2	2	2	
67	4	2	4	3	
68	4	3	1	4	
69	2	2	4	1	
70	4	4	1	3	
71	4	2	4	3	
72	1 .	1	1		
73	×2	2	3		
74	1	2	3	1	
75	1	4		1	
76	2	3	1 2	1	
77	4	4	3	2	
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80	1	4		2	
81	4	1	3	4	
82	1		2	<u>x 1</u>	
83	3	3		3	
84	3	4	3	4	
85	1			4	
86	2	4 2	2	1	
87	3	2	3 2	1	
88	4	2		1	
89	1	1	2	2	
90	3	3	2	1	
91	3	4	3	4	
92	4		3	1	
93	3	1	2	82	-
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95	4	1	1	4	
96 97		2	12	2	
97	3	3	2	2	
	4	4	1	2	
99	2	1	3	1	
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