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PG-EE-July, 2024

SUBJECT: Physics

SET-Y

10013

		Sr. No
Time: 11/4 Hours	Max. Marks: 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		
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- 1. The width of the plateau region in a GM counter depends upon :
 - (1) Type of radiation
 - (2) Energy of radiation
 - (3) Both (1) and (2)
 - (4) None of the above
- 2. Which of the following is a better material for shielding of Beta radiations?
 - (1) Aluminum
 - (2) Lead
 - (3) Platinum
 - (4) Bismuth
- 3. The reaction time for a direct nuclear reaction is of the order of:
 - (1) 10^{-10} second
 - (2) 10^{-15} second
 - (3) 10^{-20} second
 - (4) 10^{-30} second
- 4. Which of the following is not true about Alpha emission?
 - (1) The atomic number of parent nucleus decreased by 2 after Alpha mission.
 - (2) The mass number of parent nucleus decreased by 4 after Alpha mission.
 - (3) The Alpha emission spectrum is a continuous spectrum.
 - (4) The most energetic Alpha particles are emitted from Polonium-212.
- 5. The energy of a thermal neutron at 27°C is:
 - (1) 0.026eV
 - (2) 0.26eV
 - (3) 2.6eV
 - (4) 26eV

(1) 10^{12}Kgm^{-3}

(3) 10^{22} Kgm^{-3}

7. Beta decay is a consequence of:

	(1) strong nuclear force	the partial of the program of the program of the State of
	(2) electromagnetic force	
	(3) weak nuclear force	
	(4) gravitational force	
8.	The number of electron-ion pairs created gas having ionization potential equal to 25	by a Gamma radiation of energy 1 MeV in a V is:
	(1) 6.4×10^6	(2) 6.4×10^4
. Y.,	(3) 4×10^6	$(4) 4 \times 10^4$
9.	The minimum energy of photon required (1) 1.022 eV (2) 1.022 KeV (3) 1.022 MeV (4) 511 KeV	n et manne de provincia de la materia de la composition della comp
10.	and the second s	
	(1) K	de the sample of the control of the same of the control of the same of the control of the contro
	(2) 3R/4	Section of the education of the section of the section of
	(3) 5R/36 (4) 8R/9	Vanish tale
11.	. The ratio of the longest wavelength an spectral series of the emission spectrum of	d the shortest wavelength observed in high
	(1) 4/3	(2) 525/376
	(3) 25/1	(4) 36/1
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(2) 10^{17}Kgm^{-3}

(4) 10^{27} Kgm^{-3}

The density of the nucleus is of the order of:

12. The selection rules for passing back effect are:

(1)
$$\Delta m_i = 0$$

(2)
$$\Delta m_j = 0, \pm 1$$

(3)
$$\Delta m_j = 0, \pm 1, \Delta m_s = 0$$

(4)
$$\Delta m_i = 0, \pm 1, \Delta m_s = 0, \pm 1$$

13. The possible values of magnetic quantum number for each l are given by :

$$(1) 2l - 1$$

(2)
$$2l+1$$
,

(3)
$$l-2$$
,

$$(4) l+1$$

14. The splitting of a single line singlet into three component lines in the presence of magnetic field is:

- (1) Paschen-Back effect
- (2) Normal Zeeman effect
- (3) Anomalous Zeeman Effect
- (4) Joule-Kelvin effect

15. The possible values of Jz for ${}^2D_{3/2}$ state of an electron are :

(1)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(2)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar; \frac{-3}{2}\hbar$$

(3)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(4)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar$$

16. The full form of laser is:

- (1) Light Amplification of Stimulated Emission Radiation
- (2) Light Amplification of Spontaneous Emission Radiation
- (3) Light Amplification by Spontaneous Emission of Radiation
- (4) Light Amplification by Stimulated Emission of Radiation

- 17. The coherence length of a laser beam with wavelength 440nm and coherence time $40\mu s$ is :
 - (1) 11 Km

(2) 12 Km

(3) 1.1 m

- (4) 1.2 Km
- 18. If the distance between two plane mirrors forming the resonant cavity is 0.3 m, then the difference between frequencies of consecutive modes will be:
 - (1) 500MHz

(2) 100MHz

(3) 5MHz

- (4) IMHz
- 19. The function of Helium atom in the Helium-Neon laser is:
 - (1) to provide energy to the Neon atoms
 - (2) to quench the Neon atoms
 - (3) to make Ncon atoms inactive
 - (4) none of the above
- 20. In ruby laser, the rod is surrounded by a helical photographic flash lamp filled with:
 - (1) neon
 - (2) xenon
 - (3) aluminum
 - (4) chromium
- 21. The energy of the lowest state in one dimensional box of length a is:
 - (1) Zero
 - $(2) \frac{h}{4ma^2}$
 - $(3) \frac{h}{8ma^2}$
 - $(4) \frac{h^2}{8ma^2}$

The wavefunction of a particle is given by:

$$\psi = Ae^{-kx} \text{ for } 0 < x < \infty$$
$$= 0 \qquad \text{for } -\infty < x < 0$$

The value of Λ is:

(1) $\sqrt{\frac{k}{2}}$

(3) $\sqrt{\frac{2}{k}}$

In one dimensional potential box of length a, the probability of finding a particle will be maximum at:

(1) Zero

(3) $\frac{a}{2}$

24. According to Schrödinger, a particle is equivalent to:

- (1) A sound wave
- (2) A wave packet
- (3) A light wave
- (4) A single wave

25. An eigenfunction of an operator $\frac{d^2}{dx^2}$ is e^{ax} . The corresponding eigenvalue will be:

(1) 1 (2) $\alpha^{0.5}$

 $(3) \alpha$

(4) α^2

If an electron, a proton, and a neutron have same de-Broglie wavelength, then which particle has greater velocity?

- (1) Election
- (2) Proton
- (3) Neutron
- (4) All have same velocity

(3) 2:1

27.	If an α -particle and a wavelengths of the α - particle	proton have same kinetice and the proton will be	energy, then	the	ratio
•	(1) 1:2	(2) 1:4			

(4) 4:1

28. The linear momentum of a photon with weavelength λ will be:

(1) Zero (2) $\frac{h}{\lambda}$ (3) $\frac{h}{\lambda^2}$ (4) $\frac{h}{c^2}$

29. The threshold wavelength of sodium metal is 6800 Å. The work function of sodium metal is:

(1) 0.91 eV (2) 1.82eV (3) 2.27eV (4) 3.64eV

30. If the uncertainty in the position of an electron is 1 Å, then the value of uncertainty in its momentum will be:

- (1) $6.6 \times 10^{-34} \text{Kgms}^{-1}$ (2) $2.2 \times 10^{-34} \text{Kgms}^{-1}$
- (3) $3.33 \times 10^{-24} \text{Kgms}^{-1}$ (4) $1.03 \times 10^{-24} \text{Kgms}^{-1}$

31. What should be the velocity of an electron so that its linear momentum becomes equal to that of a photon of wavelength 10 Å?

- (1) $3 \times 10^8 \text{ ms}^{-1}$ (2) $3 \times 10^7 \text{ms}^{-1}$
- (3) $7.27 \times 10^6 \text{ms}^{-1}$ (4) $7.27 \times 10^5 \text{ms}^{-1}$

32. An electron is accelerated from rest through a potential difference of 200 v. If e/m for electron is 1.6×10^{11} C/Kg, the speed acquired by the electron will be:

(1) $8 \times 10^6 \text{ms}^{-1}$

- (2) $8 \times 10^5 \text{ms}^{-1}$
- (3) $5.656 \times 10^6 \text{ms}^{-1}$ (4) $5.656 \times 10^5 \text{ms}^{-1}$

33.	According to Debye theory, the spe proportional to:	ecific heat of solids at low temperature is
	(1) T^0	(2) T
	(3) T^2	(4) T^3
34.	Which of the following is not correct wi	th regard to Debye approximation?
	(1) Debye theory obeys Doulong and Po	etit's law at high temperatures.
	(2) The quantum considerations carry g	reat significance at high temperatures.
	all temperatures.	bey same statistics as that obeyed by photons at
	(4) The specific heat of solids is propor	tional to T ³ at low temperatures.
35.	How many space Lattices can be obtained	ed from the different crystal systems?
	(1) 8	(2) 14
	(3) 32	(4) 230
36.	How many unit cells are present in a cu [Atomic mass of Na and CI are 23 and 3	be - shaped ideal crystal of NaCI of mass 1g? 5.5, respectively]
	$(1) \ \ 1.03 \times 10^{22}$	$(2) 5.14 \times 10^{21}$
	(3) 2.57×10^{21}	(4) 1.03×10^{21}
37.	The number of carbon atoms per unit ce	Il of diamond unit cell is:
	(1) 1	(2) 4
	(3) 6	(4) 8
38.	The number of close neighbour in a bod	y centered cubic lattice of identical sphere is:
	(1) 2	(2) 4
	(3) 6	(4) 8
	1. 183 199	

39.	In face centered cubic unit cell, the edge length is:
	$(1) \ \frac{4}{\sqrt{2}}r $ $(2) \ \frac{\sqrt{3}}{2}r$
	$(3) \frac{4}{3}r \qquad \qquad (4) 2r$
40.	The ratio of density of lattice points in (110) and (111) planes in a simple cubic lattice is:
	(1) 1:1
	(1) 1:1 (2) 1:2 (3) $\sqrt{3}:\sqrt{2}$ (4) $\sqrt{2}:\sqrt{3}$
41.	The set of Miller Indices for a plane which cuts off intercepts in the ratio 2a:4b:1c is:
	(1) (214)
9	(3) (124) (4) (142)
42.	If a plane makes intersects of 2, 1 and 0.5 Å on the crystallographic axes of an orthorhombic crystal with a:b:c = $3:2:1$, then the Miller indices of this plane are:
<u>.</u>	(1) (421) (3) (433) (2) (344) (4) (321)
43.	Which of the following has the least packing fraction?
	(1) Simple cubic structure
	(2) Body centered cubic structure
	(3) Face centered cubic structure
	(4) Diamond structure
44.	The volume of the primitive unit cell of fcc structure with a lattice constant a is:
	(1) $\frac{a^3}{8}$ (2) $\frac{a^3}{4}$
	a^{3} (4) a^{3}

- 45. Which of the following is **not** true regarding wavelength of X-rays used in X-ray diffraction method?
 - (1) When the wavelength of the X-rays is much smaller than the interplanar spacing then the X-rays are diffracted through angles which are too smart to be measured experimentally.
 - (2) X-rays having wavelength equal to the interplanar spacing are appropriate for X-ray diffraction
 - (3) X-rays having wavelength just greater than twice the interplanar spacing are most appropriate for x-ray diffraction
 - (4) Both (1) &(2).
- 46. The wavelength corresponding to the maximum intensity emitted by a body is:
 - (1) directly proportional to the temperature of the body
 - (2) inversely proportional to the temperature of the body
 - (3) directly proportional to the 4th power of the temperature of the body
 - (4) inversely proportional to the 4th power of the temperature of the body
- 47. The phenomenon known as Bose-Einstein condensation was invoked by F. London to explain:
 - (1) the free electron theory
 - (2) superfluidity exhibited by liquid ³He
 - (3) the Planck's radiation law
 - (4) London equation
- 48. Which of the following statistics is classical statistics?
 - (1) Maxwell-Boltzmann statistics
 - (2) Bose-Einstein statistics
 - (3) Fermi-Dirac statistics
 - (4) Both (1) and (3)

49.	The minimum volume of phase space c	ell in Fermi-Dirac statistics is	equal to:
	(1) \hbar^3	(2) h^3	
		h^3	
	(3) zero	$(4) \frac{\alpha}{c}$	
50.	Stefan's constant depends upon:		
	(1) Energy radiated per unit area per se	econd	
	(2) Temperature of the black body	Almos and the	
	(3) Both (1)&(2)		
	(4) Does not depend upon (1)&(2)	and the second of the second o	
51.	The particles describe by antisymmetri	c wave functions are known a	s:
	(1) Photons	(2) Fermions	
	(3) Bosons	(4) Gravitons	
52.	In case of Fermi-Dirac statistics, all pato:	rticles cannot come down to the	he ground state due
	(1) Pauli's exclusion principle		क्ती क्र
:	(2) Heisenberg uncertainty principal	Diago.	Attention (14.
	(3) Gibb's free energy principle		and the second
	(4) Plank's law		Yahiri .
53.	If Two stars X and Y emit light of c temperature will be greater for	orange and yellow colours, re-	spectively, then the
	(1) X		
	(2) Y		
	(3) Both have same temperature	- Audition	
	(4) Can't say anything		
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- 54. Six distinguishable particles are distributed in two compartments with equal a priori probability. Then the probability of the most probable microstate is:
 - $(1) \frac{15}{32}$

(2) $\frac{15}{64}$

(3) $\frac{5}{16}$

- (4) $\frac{5}{32}$
- **55.** The Fourier transform, F(k) of the function $f(x) = e^{-|x|}$ is:
 - $(1) \ \frac{1}{1+ik}$

 $(2) \ \frac{1}{1-ik}$

(3) $\frac{2}{1+k^2}$

- (4) $\frac{1}{1+k^2}$
- 56. If two lenses of focal lengths 9 cm and 3 cm are placed at a certain distance apart to form an achromatic combination, then the distance between the lenses is:
 - (1) 2.25 cm

(2) 4.50 cm

(3) 6 cm

- (4) 12 cm
- 57. The aberrations produced by the variation of refractive index with wavelength of light are called:
 - (1) Spherical aberrations
 - (2) chromatic aberrations
 - (3) astigmatism
 - (4) none of the above
- 58. Which of the following is the result of varying magnification of rays refracted through different zones of the lens?
 - (1) Coma
 - (2) Astigmatism
 - (3) Hypermetropia
 - (4) Myopia

- 59. In the construction of Fresnel's biprism two acute angled prisms are placed to base. Actually, it is constructed as a single prism of obtuse angle of about:
 - (1) 180°

(2) 179°

(3) 178°

(4) 177°

- 60. If the central fringe is displaced to the position, which was occupied by 1st bright fringe on placing a thin mica sheet of thickness 1.2 μm in the path of one of the interfering beams in a biprism arrangement, then the refractive index of mica sheet will be (wavelength of light used is 6000 Å):
 - (1) 1.4

(2) 1.5

(3) 1.6

- (4) 1.7
- 61. According to Lloyd's single mirror experiment, a light wave after reflection from an optically denser medium undergoes a phase change of:
 - $(1) \frac{\pi}{2}$

(2) π

(3) $\frac{3\pi}{2}$

- (4) 2π
- 62. The ratio of adiabatic to isochoric pressure coefficient of expansion of a gas is $\left(\gamma = \frac{C_p}{C}\right)$:

(2) $\frac{\gamma}{\gamma+1}$

 $(3) \frac{\gamma}{\gamma - 1}$

- $(4) \frac{1}{\gamma}$
- 63. Which of the following is called first latent heat equation? (where symbols have usual meaning)

$$(1) \frac{dP}{dT} = \frac{L}{T(V_2 - V_1)}$$

$$(2) \frac{dP}{dT} = \frac{LT}{(V_2 - V_1)}$$

(3)
$$\frac{dP}{dT} = \frac{L(V_2 - V_1)}{T}$$

(4)
$$\frac{dP}{dT} = \frac{T(V_2 - V_1)}{I}$$

- 64. Which of the following is not a thermodynamical potential?
 - (1) Internal energy
 - (2) Entropy
 - (3) Enthalpy
 - (4) Helmholtz free energy
- 65. One mole of an ideal gas at an initial temperature of T Kelvin does 6R Joule of work adiabatically. If the ratio specific heats of this gas at constant pressure and at constant volume is 5/3, the final temperature of the gas will be:
 - (1) (T+4) K
 - (2) (T-4) K
 - (3) (T+10) K
 - (4) (T-10) K
- 66. When a gas passes through a porous plan heating effect takes place:
 - (1) If temperature of the gas is less than its temperature of inversion
 - (2) If temperature of the gas is equal to its temperature of inversion
 - (3) If temperature of gas is more than its temperature of inversion
 - (4) None of the above
- 67. Which of the following is scientific language of computer?
 - (1) PASCAL
 - (2) FORTRAN
 - (3) BASIC
 - (4) COBOL
- 68. During an adiabatic reversible process, the entropy:
 - (1) increases
 - (2) decreases
 - (3) first increases then decreases
 - (4) remains constant

69.

ice point?

(1) 26.81 %

(3) 43.47%

70. An oscillator consists:

(a) of a positive feedback amplifier

	(b) has noise as the initial signal		
	(c) consists of a noise selecting n	etwork	
	(d) consists of a noise injecting n	etwork	
	Which of the above statements are	e correct?	
	(1) a & d		
	(2) b & d		
	(3) a, b & c		A TOP OF THE PROPERTY OF
		= 1	
71.	Voltage gain is highest in:		A STATE OF THE STA
	(1) Common base amplifier		等的 ** (Control
	(2) Common collector amplifier	LAGO.	to white the
	(3) Common emitter amplifier	And the Late of the Same	Mil inv
	(4) A Diode in forward bias		Above
72.	In a common base amplifier, if then base current is:	the emitter current is 2 mA a	and current gain is 0.9
	(1) 1.98 mA	(2) 2.02 mA	Kiki
	(3) 0.02 mA	(4) 0.2 mA	
73.	Which of the following is used f	for rectifying action?	
	(1) Transistor		The state of the
	(2) Diode		
	(3) Capacitor		
	(4) Inductor		
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What is the efficiency of a Carnot's engine working between the steam point and the

(2) 33.29%

(4) 100%

- 74. Which of the following is true in case of a PN junction diode?
 - (1) In forward bias the current flows due to majority charge careers
 - (2) The width of the depletion region decreases in reverse bias
 - (3) The avalanche breakdown takes place in forward bias
 - (4) None of the above
- 75. Charge on a p-type semiconductor is:
 - (1) Positive
 - (2) Negative
 - (3) Zero
 - (4) 10^{-12} coulomb
- 76. The effective mass of an electron in a semiconductor:
 - (1) can never be negative
 - (2) can never be positive
 - (3) can be positive or negative
 - (4) depends on its spin
- 77. An ac generator produces an EMF of amplitude 22 V at a frequency 50 Hz, it is connected to a circuit containing 10 mH inductor. The current in the circuit is:

$$(1) 22 \sin\left(100\pi t + \frac{\pi}{2}\right)$$

(2)
$$22 \sin \left(100\pi t - \frac{\pi}{2}\right)$$

(3)
$$7 \sin \left(100\pi t + \frac{\pi}{2} \right)$$

$$(4) 7 \sin\left(100\pi t - \frac{\pi}{2}\right)$$

- 78. A Space ship is approaching a source of light with a speed equal to 0.5c (c is speed of light). Light coming from the source of light as seen by the observer in the space ship travels with a speed equal to:
 - (1) 0.5c
 - (2) c
 - (3) 1.5c
 - (4) 2c

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79.	The temperature at which the average sp molecules at 35°C will be:	peed of H ₂ molecules will be	same as that of N2
	(1) 2.5°C	(2) 6.25°C	
	(3) -50°C	(4) -251°C	
80.	The elastic fatigue distinctly illustrated	in :	
	(1) Iron	(2) Silver	4-1
	(3) Quartz	(4) Glass	
81.	The Young's modulus of a wire of leng to L/2 and radius to R/2, it's Young's m	th L and radius R is Y. If the nodulus will be:	e length is reduced
	(1) Y/2	(2) Y	
	(3) 2Y	(4) 4Y	in a training
82.	Practical value of Poisson's ratio (o) ca	n be :	
	(1) Less than zero		Le Contraction de la contracti
: :· :	(2) Between 0 and 0.5	The Market St., Mr. 19	distance in the
	(3) Between –1 and 0.5		A KARA
d	(4) Greater than 0.5		Section 1
83.	The potential energy per unit volume shall be equal to:	for a body strained under	a longitudinal strai
	(1) stress × strain		
	(2) stress \times (strain) ²		11000
	(3) $1/2 \text{ stress} \times (\text{strain})^2$		
9	(4) 1/2(stress × strain)	Merchanic care callege	gide iz
84.	The Boltzmann's constant depends on	 The state of place the state of a state of	
	(1) Temperature		
	(2) Volume and Temperature		

(3) Pressure, volume and Temperature

(4) None of the above

85.	The pressure exerted on the walls of the container by a gas is due to the fact that the gas molecules:
	(1) lose their kinetic energy
	(2) stick to the walls
	(3) are accelerated towards the walls
	(4) change their momenta due to collision with the walls
86.	If a moving charge particle passes through region having random magnetic field, there the kinetic energy of the charge particle will:
	(1) Increase
	(2) Decrease
	(3) Remain same
	(4) Increase or decrease depending upon the nature of charge particle
87.	If two long current carrying conductors are placed parallel to each other in free space and current is passing through both the conductors in same directions, then the force between them will be:
	(1) Attractive (2) Repulsive
	(3) No force (4) Can't say anything
38.	The area of hysteresis loop for a ferromagnetic material represents:
	(1) The square of magnetism per cycle
	(2) Energy loss per cycle
	(3) Coercivity
	(4) Retentivity
39.	The concept of displacement current was proposed by:
	(1) Faraday
	(2) Ampere
	(3) Biot-Savart
	(4) Maxwell

- 90. A charged capacitor (C) is connected in series with an inductor (L). When the displacement current reduces to zero, the energy of the LC circuit is:
 - (1) stored entirely in its magnetic field
 - (2) stored entirely in its electric field
 - (3) distributed equally among its electric and magnetic fields
 - (4) radiated out of the circuit
- **91.** If $\phi = yz$, then its gradient is:

$$(1)$$
 $zi + yk$

(2)
$$yj + zk$$

(3)
$$i + j + k$$

92. The divergence of a position vector is:

- 93. A theorem that relates surface integral with the volume integral is called:
 - (1) Stocks theorem
 - (2) Carnot's theorem
 - (3) Greens theorem
 - (4) Gauss-divergence theorem
- 94. If a vector is solenoidal, then:

$$(1) \ \overrightarrow{A} = 0$$

(2)
$$\nabla \cdot \overrightarrow{A} = 0$$

(3)
$$\nabla \times \overrightarrow{A} = 0$$

(4)
$$\nabla \cdot \left(\nabla \times \overrightarrow{A} \right) = 0$$

95.	A disc, ring and sphere of the same radius are allowed to roll down an inclined plane from the same height without slipping, which one has highest kinetic energy?
	(1) Disc
	(2) Ring
7	(3) Sphere
	(4) All have same kinetic energy
96.	The rate of change of linear momentum with respect to time is equal to:
	(1) Torque
	(2) Angular velocity
	(3) Force
	(4) Power
97.	If the moment of inertia for a solid sphere about any diameter is 2/5MR ² , then the moment of Inertia of the same sphere about a tangent is:
	(1) $2/5 \text{ MR}^2$
	(2) 3/5 MR ²
	(3) $4/5 \text{ MR}^2$
	(4) $7/5MR^2$
98.	The ice skaters, ballet dancers, and dives often use the principle of conservation of:
	(1) Mass and energy
	(2) Linear momentum
	(3) Angular momentum

(4) All of the above

99. The Lagrangian of an Atwood's machine is :

(1)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(2)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + \frac{1}{2} (m_1 - m_2) gx - V_0$$

(3)
$$(m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(4)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 + m_2) gx - V_0$$

- 100. A cylinder of mass M and radius R is rolling down without sleeping on an incline plane of angle of inclination θ . The number of generalized coordinate required t describe the motion of the system :
 - (1) 1

(2) 2

(3) 4

(4) 6

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	JESTION BOOKLET BEFORE ARE ASKED TO DO SO) PG-EE-July, 2024	TIME OR UNTIL YOU SET-Y
	SUBJECT: Physics	10014 Sr. No.
Time: 11/4 Hours Roll No. (in figures) Name	Max. Marks : 100 (in words) Date of Birth	Total Questions :/10
Father's Name Date of Examination		
(Signature of the Candidate)		Signature of the Invigilator)
CANDIDATES MUST READ	THE FOLLOWING INFORMATION/IN	NSTRUCTIONS BEFORE

1. All questions are compulsory.

- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. 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 booklet itself. Answers **must** not be ticked in the question booklet.
- 6. There will be no negative marking. Each correct/answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

	1. Voltage gain is highest in:	
	(1) Common base amplifier	a for the second
	(2) Common collector amplifier	
	(3) Common emitter amplifier	
	(4) A Diode in forward bias	
2	2. In a common base amplifier, if the emitted then base current is:	er current is 2 mA and current gain is 0.99
	(1) 1.98 mA	2) 2.02 mA
	(3) 0.02 mA) 0.2 mA
3.	3. Which of the following is used for rectifying	g action?
	(1) Transistor (2) Diode
	(3) Capacitor (4) Inductor
4.	4. Which of the following is <i>true</i> in case of a	PN junction diode?
	(1) In forward bias the current flows due to	majority charge careers
	(2) The width of the depletion region decre	ases in reverse bias
	(3) The avalanche breakdown takes place in	n forward bias
	(4) None of the above	
5.	Charge on a p-type semiconductor is:	
	(1) Positive	in the major, by the same
	(2) Negative	Tra.
	(3) Zero	
	(4) 10^{-12} coulomb	
	. The second of	eastern earling in the Arms
6.	. The effective mass of an electron in a semic	onductor:

- (1) can never be negative
- (2) can never be positive
- (3) can be positive or negative
- (4) depends on its spin

7.	An ac generator produces an EMF of amplitude 22 V at a frequency 50 Hz, it is connected to a circuit containing 10 mH inductor. The current in the circuit is:
	(1) $22 \sin\left(100\pi t + \frac{\pi}{2}\right)$ (2) $22 \sin\left(100\pi t - \frac{\pi}{2}\right)$
	(3) $7 \sin \left(100\pi t + \frac{\pi}{2}\right)$ (4) $7 \sin \left(100\pi t - \frac{\pi}{2}\right)$
8.	A Space ship is approaching a source of light with a speed equal to 0.5c (c is speed of

light). Light coming from the source of light as seen by the observer in the space ship
travels with a speed equal to:
(1) 0.50

- (3) 1.5c (4) 2c
- 9. The temperature at which the average speed of H₂ molecules will be same as that of N2 molecules at 3,5°C will be:
 - (1) 2.5°C (2) 6.25°C (3) -50°C (4) -251°C
- 10. The elastic fatigue distinctly illustrated in:
 - (1) Iron (2) Silver
 - (3) Quartz (4) Glass
- 11. The particles describe by antisymmetric wave functions are known as:
 - (1) Photons (2) Fermions
 - (3) Bosons (4) Gravitons

12. In case of Fermi-Dirac statistics, all particles cannot come down to the ground state due to:

- (1) Pauli's exclusion principle
- (2) Heisenberg uncertainty principal
- (3) Gibb's free energy principle
- (4) Plank's law

- 13. If Two stars X and Y emit light of orange and yellow colours, respectively, then the temperature will be greater for
 - (1) X
 - (2) Y
 - (3) Both have same temperature
 - (4) Can't say anything
- 14. Six distinguishable particles are distributed in two compartments with equal a priori probability. Then the probability of the most probable microstate is:
 - (1) $\frac{15}{32}$

(2) $\frac{15}{64}$

(3) $\frac{5}{16}$

- (4) $\frac{5}{32}$
- **15.** The Fourier transform, F(k) of the function $f(x) = e^{-|x|}$ is:
 - $(1) \ \frac{1}{1+ik}$

 $(2) \ \frac{1}{1-ik}$

(3) $\frac{2}{1+k^2}$

- (4) $\frac{1}{1+k^2}$
- 16. If two lenses of focal lengths 9 cm and 3 cm are placed at a certain distance apart to form an achromatic combination, then the distance between the lenses is:
 - (1) 2.25 cm

(2) 4.50 cm

(3) 6 cm

- (4) 12 cm
- 17. The aberrations produced by the variation of refractive index with wavelength of light are called:
 - (1) Spherical aberrations
 - (2) chromatic aberrations
 - (3) astigmatism
 - (4) none of the above

19. In the construction of Fresnel's biprism two acute angled prisms are placed to base. Actually, it is constructed as a single prism of obtuse angle of about :

(1) 180°

4

(2) 179°

(3) 178°

(4) 177°

If the central fringe is displaced to the position, which was occupied by 1st bright fringe on placing a thin mica sheet of thickness 1.2 µm in the path of one of the interfering beams in a biprism arrangement, then the refractive index of mica sheet will be (wavelength of light used is 6000 Å):

(1) 1.4

(2) 1.5

(3) 1.6

(4) 1.7

What should be the velocity of an electron so that its linear momentum becomes equal to that of a photon of wavelength 10 Å?

(1) $3 \times 10^8 \text{ ms}^{-1}$

(2) $3 \times 10^7 \text{ms}^{-1}$

(3) $7.27 \times 10^6 \text{ms}^{-1}$

(4) $7.27 \times 10^5 \text{ms}^{-1}$

An electron is accelerated from rest through a potential difference of 200 v. If e/m for electron is 1.6×10^{11} C/Kg, the speed acquired by the electron will be:

(1) $8 \times 10^6 \text{ms}^{-1}$

(2) $8 \times 10^5 \text{ms}^{-1}$

 $(3) \cdot 5.656 \times 10^6 \text{ms}^{-1}$

(4) $5.656 \times 10^5 \text{ms}^{-1}$

P. T. O.

2	3. According		eory, the	specific heat o	of solids at	low temperature i
	(1) T^0			(2) T		
	$(3) T^2$			(4) T^3		
24	Which of t	he following is	not correct	with regard to D	ebye approxi	mation?
	(1) Debye	theory obeys D	oulong and	Petit's law at hig	gh temperatur	es.
	(2) The qu	antum consider	ations carry	great significan	ice at high ten	nperatures.
		temperatures the	ne phonons	obey same statis	stics as that o	beyed by photons a
	(4) The spe	ecific heat of so	lids is prop	ortional to T ³ at	low temperati	ures.
25.	How many	space Lattices o	an be obtai	ned from the dif	ferent crystal	systems?
	(1) 8 (3) 32			(2) 14(4) 230	ng HPP4X	
26.	•	-		cube - shaped id 35.5, respective		NaCl of mass lg
	(1) 1.03 × 1	0^{22} .		(2) 5.14×10	21	
	(3) 2.57 × 1	0 ²¹	d vorantan a	(4) 1.03 × 10	21 1) konsus	6
27.	The number	of carbon atom	s per unit c	ell of diamond u	nit cell is:	1
	(1) 1		1 1 1	(2) 4		
	(3) 6	Logitar Sir.		(4) 8	that It is	4
28.	The number	of close neighbo	our in a boo	ly centered cubi	c lattice of id	entical sphere is:
	(1) 2			(2) 4	(Completed)	
	(3) 6			(4) 8	J.J. T.Yes	

29. I	n face	centered	cubic	unit	cell,	the	edge	length	18:	
-------	--------	----------	-------	------	-------	-----	------	--------	-----	--

$$(1) \ \frac{4}{\sqrt{2}}r$$

$$(2) \ \frac{\sqrt{3}}{2}r$$

(3)
$$\frac{4}{3}r$$

30. The ratio of density of lattice points in (110) and (111) planes in a simple cubic lattice is:

(3)
$$\sqrt{3}:\sqrt{2}$$

(4)
$$\sqrt{2}:\sqrt{3}$$

31. The ratio of the longest wavelength and the shortest wavelength observed in high spectral series of the emission spectrum of hydrogen is:

32. The selection rules for passing back effect are:

(1)
$$\Delta m_i = 0$$

(2)
$$\Delta m_i = 0, \pm 1$$

(3)
$$\Delta m_i = 0, \pm 1, \Delta m_s = 0$$

(4)
$$\Delta m_j = 0, \pm 1, \Delta m_s = 0, \pm 1$$

33. The possible values of magnetic quantum number for each l are given by :

$$(1) 2l-1,$$

$$(2) 2l + 1,$$

(3)
$$l-2$$
,

(4)
$$l+1$$

34. The splitting of a single line singlet into three component lines in the presence of magnetic field is:

- (1) Paschen-Back effect
- (2) Normal Zeeman effect
- (3) Anomalous Zeeman Effect
- (4) Joule-Kelvin effect

35. The possible values of Jz for ${}^{2}D_{3/2}$ state of an electron are :

(1)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(2)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar; \frac{-3}{2}\hbar$$

(3)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(4)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar$$

36. The full form of laser is:

- (1) Light Amplification of Stimulated Emission Radiation
- (2) Light Amplification of Spontaneous Emission Radiation
- (3) Light Amplification by Spontaneous Emission of Radiation
- (4) Light Amplification by Stimulated Emission of Radiation

37. The coherence length of a laser beam with wavelength 440nm and coherence time 40μs is:

(1) 11 Km

(2) 12 Km

(3) 1.1 m

(4) 1.2 Km

38. If the distance between two plane mirrors forming the resonant cavity is 0.3 m, then the difference between frequencies of consecutive modes will be:

(1) 500MHz

(2) 100MHz

(3) 5MHz

(4) IMHz

39. The function of Helium atom in the Helium-Neon laser is:

- (1) to provide energy to the Neon atoms
- (2) to quench the Neon atoms
- (3) to make Ncon atoms inactive
- (4) none of the above

- 40. In ruby laser, the rod is surrounded by a helical photographic flash lamp filled with:
 - (1) neon
 - (2) xenon
 - (3) aluminum
 - (4) chromium
- 41. If $\phi = yz$, then its gradient is:
 - (1) zi + yk

(2) yj + zk

(3) i + j + k

- (4) zero
- 42. The divergence of a position vector is:
 - (1) Zero

(2) 1

(3) 3

- (4) 9
- 43. A theorem that relates surface integral with the volume integral is called:
 - (1) Stocks theorem
 - (2) Carnot's theorem
 - (3) Greens theorem
 - (4) Gauss-divergence theorem
- 44. If a vector is solenoidal, then:

$$(1) \ \overrightarrow{A} = 0$$

(2)
$$\nabla \cdot \overrightarrow{A} = 0$$

(3)
$$\nabla \times \overrightarrow{A} = 0$$

(4)
$$\nabla \cdot \left(\nabla \times \overrightarrow{A} \right) = 0$$

45. A disc, ring and sphere of the same radius are allowed to roll down an inclined pla from the same height without slipping, which one has highest kinetic energy?	ne
(1) Disc	
(2) Ring	
(3) Sphere	
(4) All have same kinetic energy	
16. The rate of change of linear momentum with respect to time is equal to:	
(1) Torque	
(2) Angular velocity	
(3) Force	
(4) Power	
7. If the moment of inertia for a solid sphere about any diameter is 2/5MR ² , then t moment of Inertia of the same sphere about a tangent is:	he
(1) $2/5 \text{ MR}^2$	
(2) $3/5 \text{ MR}^2$	
(3) $4/5 \text{ MR}^2$	
(4) 7/5MR ²	
The ice skaters, ballet dancers, and dives often use the principle of conservation of:	on

- 48.
 - (1) Mass and energy
 - (2) Linear momentum
 - (3) Angular momentum
 - (4) All of the above

- 49. The Lagrangian of an Atwood's machine is :
 - (1) $\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 m_2) gx V_0$
 - (2) $\frac{1}{2} (m_1 + m_2) \dot{x}^2 + \frac{1}{2} (m_1 m_2) gx V_0$
 - (3) $(m_1 + m_2) \dot{x}^2 + (m_1 m_2) gx V_0$
 - (4) $\frac{1}{2}(m_1+m_2)\dot{x}^2+(m_1+m_2)gx-V_0$
- 50. A cylinder of mass M and radius R is rolling down without sleeping on an inclined plane of angle of inclination θ . The number of generalized coordinate required to describe the motion of the system:
 - (1) 1

(2) 2

(3) 4

- (4) 6
- 51. According to Lloyd's single mirror experiment, a light wave after reflection from an optically denser medium undergoes a phase change of:
 - $(1) \ \frac{\pi}{2}$

(2) π

(3) $\frac{3\pi}{2}$

- (4) 2π
- **52.** The ratio of adiabatic to isochoric pressure coefficient of expansion of a gas is $\left(\gamma = \frac{C_p}{C_{...}}\right)$:
 - (1) y

(2) $\frac{\gamma}{\gamma+1}$

(3) $\frac{\gamma}{\gamma - 1}$

 $(4) \ \frac{1}{\gamma}$

- 53. Which of the following is called first latent heat equation ? (where symbols have usual meaning)
 - $(1) \frac{dP}{dT} = \frac{L}{T(V_2 V_1)}$

(2) $\frac{dP}{dT} = \frac{LT}{(V_2 - V_1)}$

 $(3) \frac{dP}{dT} = \frac{L(V_2 - V_1)}{T}$

- $(4) \frac{dP}{dT} = \frac{T(V_2 V_1)}{L}$
- 54. Which of the following is not a thermodynamical potential?
 - (1) Internal energy
 - (2) Entropy
 - (3) Enthalpy
 - (4) Helmholtz free energy
- 55. One mole of an ideal gas at an initial temperature of T Kelvin does 6R Joule of work adiabatically. If the ratio specific heats of this gas at constant pressure and at constant volume is 5/3, the final temperature of the gas will be:
 - (1) (T+4) K
 - (2) (T-4) K
 - (3) (T+10) K
 - (4) (T-l0) K
- 56. When a gas passes through a porous plan heating effect takes place:
 - (1) If temperature of the gas is less than its temperature of inversion
 - (2) If temperature of the gas is equal to its temperature of inversion
 - (3) If temperature of gas is more than its temperature of inversion
 - (4) None of the above
- 57. Which of the following is scientific language of computer?
 - (1) PASCAL
 - (2) FORTRAN
 - (3) BASIC
 - (4) COBOL
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(1) increases

(2) decreases

59. W io	What is the efficiency of a Carnot's ce point?	clighte working between	e. Our kennede in
(1) 26.81 %	(2) 33.29%	
(3) 43.47%	(4) 100%	
60. <i>A</i>	An oscillator consists:		
((a) of a positive feedback amplifier		
	(b) has noise as the initial signal		
	(c) consists of a noise selecting ne	twork	W.
ì	(d) consists of a noise injecting ne	twork	
	Which of the above statements are	correct?	
	(1) a & d		
	(2) b & d		The state of
	(3) a, b & c		
	(4) b, c & d	The frequency of the file of	
61.	The Young's modulus of a wire of to L/2 and radius to R/2, it's You	· ·	Y. If the length is red
	(1) Y/2	(2) Y	the contract of
	(3) 2Y	(4) 4Y	and the second
62.	Practical value of Poisson's ratio	(σ) can be:	
	(1) Less than zero		
	(2) Between 0 and 0.5		
	(3) Between –1 and 0.5		
	(4) Greater than 0.5		

58. During an adiabatic reversible process, the entropy:

(3) first increases then decreases

(3) No force

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The potential energy per unit volume for a body strained under a longitudinal strain 63. shall be equal to: (1) stress \times strain (2) stress \times (strain)² (3) $1/2 \text{ stress} \times (\text{strain})^2$ (4) 1/2(stress × strain) 64. The Boltzmann's constant depends on: (1) Temperature (2) Volume and Temperature (3) Pressure, volume and Temperature (4) None of the above The pressure exerted on the walls of the container by a gas is due to the fact that the 65. gas molecules: (1) lose their kinetic energy (2) stick to the walls (3) are accelerated towards the walls (4) change their momenta due to collision with the walls If a moving charge particle passes through region having random magnetic field, then 66. the kinetic energy of the charge particle will: (1) Increase (2) Decrease (3) Remain same (4) Increase or decrease depending upon the nature of charge particle If two long current carrying conductors are placed parallel to each other in free space and current is passing through both the conductors in same directions, then the force between them will be: (1) Attractive (2) Repulsive

(4) Can't say anything

(1) The square of magnetism per cycle

(2) Energy loss per cycle

(3) Coercivity

(4) Retentivity

ξ	39.	3. The concept of displacement current was proposed by:		
		(1) Faraday		
		(2) Ampere		
		(3) Biot-Savart		
		(4) Maxwell		
	70.	 A charged capacitor (C) is connected in series w displacement current reduces to zero, the energy of the 	ith an inductor LC circuit is:	(L). When the
		(1) stored entirely in its magnetic field		
		(2) stored entirely in its electric field		
		(3) distributed equally among its electric and magnetic	c fields	
		(4) radiated out of the circuit		
	71.	71. The set of Miller Indices for a plane which cuts o is:	ff intercepts in t	the ratio 2a:4b:1
		(1) (214) (2) (241)		
		(3) (124) (4) (142)		
	72	72. If a plane makes intersects of 2, 1 and 0.5 Å of orthorhombic crystal with a:b:c = 3:2:1, then the Mi	n the crystallog	raphic axes of is plane are:
		(1) (421) (2) (344)		
		(3) (433) (4) (321)		
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- 73. Which of the following has the least packing fraction?
 - (1) Simple cubic structure
 - (2) Body centered cubic structure
 - (3) Face centered cubic structure
 - (4) Diamond structure
- 74. The volume of the primitive unit cell of fcc structure with a lattice constant a is:
 - (1) $\frac{a^3}{8}$

(2) $\frac{a^3}{4}$

(3) $\frac{a^3}{2}$

- (4) a^3
- 75. Which of the following is *not* true regarding wavelength of X-rays used in X-ray diffraction method?
 - (1) When the wavelength of the X-rays is much smaller than the interplanar spacing then the X-rays are diffracted through angles which are too smart to be measured experimentally.
 - (2) X-rays having wavelength equal to the interplanar spacing are appropriate for X-ray diffraction
 - (3) X-rays having wavelength just greater than twice the interplanar spacing are most appropriate for x-ray diffraction
 - (4) Both (1) &(2).
- 76. The wavelength corresponding to the maximum intensity emitted by a body is:
 - (1) directly proportional to the temperature of the body
 - (2) inversely proportional to the temperature of the body
 - (3) directly proportional to the 4th power of the temperature of the body
 - (4) inversely proportional to the 4th power of the temperature of the body

,	The phenomenon known as Bose-Einstein condensation was	s invoked by F. London to
77.	The phenomenon known as Bose-Einstein condensation explain:	
	(1) the free electron theory	
	(2) superfluidity exhibited by liquid ³ He	

(3) the Planck's radiation law

(4) London equation

78. Which of the following statistics is classical statistics?

(1) Maxwell-Boltzmann statistics

(2) Bose-Einstein statistics

(3) Fermi-Dirac statistics.

(4) Both (1) and (3)

79. The minimum volume of phase space cell in Fermi-Dirac statistics is equal to:

(1)
$$h^3$$

(2)
$$h^3$$

$$(4) \frac{h^3}{c}$$

80. Stefan's constant depends upon:

- (1) Energy radiated per unit area per second
- (2) Temperature of the black body
- (3) Both (1)&(2)
- (4) Does not depend upon (1)&(2)

81. The energy of the lowest state in one dimensional box of length a is:

$$(2) \frac{h}{4ma^2}$$

$$(3) \frac{h}{8ma^2}$$

(4)
$$\frac{h^2}{8ma^2}$$

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The wavefunction of a particle is given by:

$$\psi = Ae^{-kx} \text{ for } 0 < x < \infty$$

$$= 0 \qquad \text{for } -\infty < x < 0$$

The value of Λ is:

(1) $\sqrt{\frac{k}{2}}$

(3) $\sqrt{\frac{2}{k}}$

 $(2) \sqrt{k}$ $(4) \sqrt{\frac{1}{k}}$

In one dimensional potential box of length a, the probability of finding a particle 83. will be maximum at:

(1) Zero

(3) $\frac{a}{2}$

(4) a

According to Schrödinger, a particle is equivalent to:

- (1) A sound wave
- (2) A wave packet
- (3) A light wave
- (4) A single wave

An eigenfunction of an operator $\frac{d^2}{dx^2}$ is e^{ax} . The corresponding eigenvalue will be: 85.

(1) 1

(2) $\alpha^{0.5}$

 $(3) \alpha$

(4) α^2

If an electron, a proton, and a neutron have same de-Broglie wavelength, then which particle has greater velocity?

- (1) Election
- (2) Proton
- (3) Neutron
- (4) All have same velocity

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8		Linetic energy, then the ratio
87.	If an α -particle and a proton h wavelengths of the α - particle and the p	ave same kinetic energy, then the ratio
	(1) 1:2	(2) 1:4
	(3) 2:1	(4) 4:1
88.	The linear momentum of a photon with	weavelength λ will be:
	(1) Zero	$(2) \frac{h}{\lambda}$ $(4) \frac{h}{c\lambda}$
	(3) $\frac{h}{\lambda^2}$	
89.	The threshold wavelength of sodium metal is:	metal is 6800 Å. The work function of sodium
	(1) 0.91 eV	(2) 1.82eV
	(3) 2.27eV	(4) 3.64eV
90.	If the uncertainty in the position of a its momentum will be:	n electron is 1 Å, then the value of uncertainty
	(1) $6.6 \times 10^{-34} \text{Kgms}^{-1}$	(2) $2.2 \times 10^{-34} \text{Kgms}^{-1}$
	(3) $3.33 \times 10^{-24} \text{Kgms}^{-1}$	(4) $1.03 \times 10^{-24} \text{Kgms}^{-1}$
91.	The width of the plateau region in a	a GM counter depends upon :
	(1) Type of radiation	
	(2) Energy of radiation	
	(3) Both (1) and (2)	
	(4) None of the above	
92.	Which of the following is a better r	material for shielding of Beta radiations?
	(1) Aluminum	(2) Lead
1	(3) Platinum	(4) Bismuth
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- 97.
 - (2) electromagnetic force
 - (3) weak nuclear force
 - (4) gravitational force

- 98. The number of electron-ion pairs created by a Gamma radiation of energy 1 MeV in gas having ionization potential equal to 25 V is:
 - (1) 6.4×10^6

(2) 6.4×10^4

 $(3) 4 \times 10^6$

- (4) 4×10^4
- 99. The minimum energy of photon required for pair production is:
 - (1) 1.022 eV
 - (2) 1.022 KeV
 - (3) 1.022 MeV
 - (4) 511 KeV
- 100. In terms of Redburg's constant (R), the wave number of first Balmer line is :
 - (1) R
 - (2) 3R/4
 - (3) 5R/36
 - (4) 8R/9

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C	PG-EE-July, 2024	SEI-Y
	SUBJECT: Physics	
Time: 11/4 Hours	Max. Marks 100	Total Questions: 10
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)	_ ///	(Signature of the Invigilator)

1. All questions are compulsory.,

- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. 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 booklet itself. Answers must not be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only/Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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1. The set of Miller Indices for a plane which cuts off intercepts in the ratio 2a:4b:1c is:

(1) (214)

(2) (241)

(3)(124)

(4)(142)

2. If a plane makes intersects of 2, 1 and 0.5 \AA on the crystallographic axes of an orthorhombic crystal with a:b:c = 3:2:1, then the Miller indices of this plane are:

(1) (421)

(2)(344)

(3)(433)

(4) (321)

3. Which of the following has the least packing fraction?

- (1) Simple cubic structure
- (2) Body centered cubic structure
- (3) Face centered cubic structure
- (4) Diamond structure

4. The volume of the primitive unit cell of fcc structure with a lattice constant a is:

(1) $\frac{a^3}{8}$

(2) $\frac{a^3}{4}$

(3) $\frac{a^3}{2}$

(4) a^3

5. Which of the following is **not** true regarding wavelength of X-rays used in X-ray diffraction method?

- (1) When the wavelength of the X-rays is much smaller than the interplanar spacing then the X-rays are diffracted through angles which are too smart to be measured experimentally.
- (2) X-rays having wavelength equal to the interplanar spacing are appropriate for X-ray diffraction
- (3) X-rays having wavelength just greater than twice the interplanar spacing are most appropriate for x-ray diffraction
- (4) Both (1) &(2).

6.	and wavelength corresponding to the maximum intensity enfitted by a body is.
	(1) directly proportional to the temperature of the body
	(2) inversely proportional to the temperature of the body
	(3) directly proportional to the 4th power of the temperature of the body
	(4) inversely proportional to the 4th power of the temperature of the body
7.	The phenomenon known as Bose-Einstein condensation was invoked by F. London to explain:
	(1) the free electron theory
	(2) superfluidity exhibited by liquid ³ He
	(3) the Planck's radiation law
	(4) London equation
8.	Which of the following statistics is classical statistics?
	(1) Maxwell-Boltzmann statistics
	(2) Bose-Einstein statistics
	(3) Fermi-Dirac statistics
	(4) Both (1) and (3)
9.	The minimum volume of phase space cell in Fermi-Dirac statistics is equal to:
	(1) h^3 (2) h^3
ten T	(3) zero $ (4) \frac{h^3}{c} $
10.	Stefan's constant depends upon:
	(1) Energy radiated per unit area per second
	(2) Temperature of the black body
	(3) Both (1)&(2)

(4) Does not depend upon (1)&(2)

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- 11. The energy of the lowest state in one dimensional box of length a is:
 - (1) Zero
 - $(2) \ \frac{h}{4ma^2}$
 - $(3) \frac{h}{8ma^2}$
 - $(4) \frac{h^2}{8ma^2}$
- 12. The wavefunction of a particle is given by:

$$\psi = Ae^{-kx} \text{ for } 0 < x < \infty$$

$$= 0 \qquad \text{for } -\infty < x < 0$$

The value of Λ is:

(1) $\sqrt{\frac{k}{2}}$

(2) \sqrt{k}

(3) $\sqrt{\frac{2}{k}}$

- $(4) \sqrt{\frac{1}{k}}$
- 13. In one dimensional potential box of length a, the probability of finding a particle will be maximum at:
 - (1) Zero

(2) $\frac{a}{4}$

(3) $\frac{a}{2}$

- (4) a
- 14. According to Schrödinger, a particle is equivalent to:
 - (1) A sound wave
 - (2) A wave packet
 - (3) A light wave
 - (4) A single wave

 $(3) \alpha$

16.	If an electron, a proton, and a neutron particle has greater velocity?	have same de-Broglie wavelength, then which
	(1) Election	
	(2) Proton	
	(3) Neutron	
	(4) All have same velocity	
17.	If an α -particle and a proton has wavelengths of the α - particle and the p	ave same kinetic energy, then the ratio roton will be
	(1) 1:2	(2) 1:4
	(3) 2:1	(4) 4:1
18.	The linear momentum of a photon with	weavelength λ will be:
	(1) Zero	$(2) \frac{h}{\lambda}$ $(4) \frac{h}{c\lambda}$
	$(3) \frac{h}{\lambda^2}$	$(4) \frac{h}{c\lambda}$
19.		netal is 6800 Å. The work function of sodium
	(1) 0.91 eV	(2) 1.82eV
	(3) 2.27eV	(4) 3.64eV
20.	If the uncertainty in the position of an its momentum will be:	electron is 1 Å, then the value of uncertainty in
	(1) $6.6 \times 10^{-34} \text{Kgms}^{-1}$	(2) $2.2 \times 10^{-34} \text{Kgms}^{-1}$
	(3) $3.33 \times 10^{-24} \text{Kgms}^{-1}$	(4) $1.03 \times 10^{-24} \text{Kgms}^{-1}$
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15. An eigenfunction of an operator $\frac{d^2}{dx^2}$ is e^{ax} . The corresponding eigenvalue will be:

(1) 1

(2) $\alpha^{0.5}$

(4) α^2

- 21. The width of the plateau region in a GM counter depends upon:
 - (1) Type of radiation
 - (2) Energy of radiation
 - (3) Both (1) and (2)
 - (4) None of the above
- 22. Which of the following is a better material for shielding of Beta radiations?
 - (1) Aluminum
 - (2) Lead
 - (3) Platinum
 - (4) Bismuth
- 23. The reaction time for a direct nuclear reaction is of the order of:
 - (1) 10^{-10} second
 - (2) 10^{-15} second
 - (3) 10^{-20} second
 - (4) 10^{-30} second
- 24. Which of the following is not true about Alpha emission?
 - (1) The atomic number of parent nucleus decreased by 2 after Alpha mission.
 - (2) The mass number of parent nucleus decreased by 4 after Alpha mission.
 - (3) The Alpha emission spectrum is a continuous spectrum.
 - (4) The most energetic Alpha particles are emitted from Polonium-212.
- 25. The energy of a thermal neutron at 27°C is:
 - (1) 0.026eV
 - (2) 0.26eV
 - (3) 2.6eV
 - (4) 26eV

26.	The density of	the nucleus	is of the order of	•
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(1) 10¹²Kgm⁻³

(2) 10¹⁷Kgm⁻¹

(3) 10²² Kgm³

(4) 10²⁷ Kgm⁻³

27. Beta decay is a consequence of:

- (1) strong nuclear force
- (2) electromagnetic force
- (3) weak nuclear force
- (4) gravitational force

28. The number of electron-ion pairs created by a Gamma radiation of energy 1 MeV in a gas having ionization potential equal to 25 V is:

(1) 6.4×10^6

(2) 6.4×10^4

 $(3) 4 \times 10^6$

(4) 4×10^4

29. The minimum energy of photon required for pair production is:

- (1) 1.022 eV
- (2) 1.022 KeV
- (3) 1.022 MeV
- (4) 511 KeV

30. In terms of Redburg's constant (R), the wave number of first Balmer line is:

- (1) R
- (2) 3R/4
- (3) 5R/36
- (4) 8R/9

31. If $\phi = yz$, then its gradient is :

(1) zi + yk

(2) yj + zk

(3) i + j + k

(4) zero

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32. The divergence of a position vector is:

(1) Zero

(2) 1

 $(3) \ 3$

(4) 9

33. A theorem that relates surface integral with the volume integral is called:

- (1) Stocks theorem
- (2) Carnot's theorem
- (3) Greens theorem
- (4) Gauss-divergence theorem

34. If a vector is solenoidal, then:

- (1) $\overrightarrow{A} = 0$
- (2) $\nabla \cdot \overrightarrow{A} = 0$
- (3) $\nabla \times \overrightarrow{A} = 0$
- (4) $\nabla \cdot (\nabla \times \overrightarrow{A}) = 0$

35. A disc, ring and sphere of the same radius are allowed to roll down an inclined plane from the same height without slipping, which one has highest kinetic energy?

- (1) Disc
- (2) Ring
- (3) Sphere
- (4) All have same kinetic energy

36. The rate of change of linear momentum with respect to time is equal to:

- (1) Torque
- (2) Angular velocity
- (3) Force
- (4) Power

- 37. If the moment of inertia for a solid sphere about any diameter is 2/5MR², then the moment of Inertia of the same sphere about a tangent is:
 - (1) $2/5 \text{ MR}^2$
 - (2) $3/5 \text{ MR}^2$
 - $(3) 4/5 MR^2$
 - $(4) 7/5MR^2$
- 38. The ice skaters, ballet dancers, and dives often use the principle of conservation of:
 - (1) Mass and energy
 - (2) Linear momentum
 - (3) Angular momentum
 - (4) All of the above
- 39. The Lagrangian of an Atwood's machine is:

(1)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(2)
$$\frac{1}{2}(m_1+m_2)\dot{x}^2+\frac{1}{2}(m_1-m_2)gx-V_0$$

(3)
$$(m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(4)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 + m_2) gx - V_0$$

- 40. A cylinder of mass M and radius R is rolling down without sleeping on an inclined plane of angle of inclination θ . The number of generalized coordinate required to describe the motion of the system :
 - (1) 1

(2) 2

(3) 4

(4) 6

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- According to Lloyd's single mirror experiment, a light wave after reflection from an optically denser medium undergoes a phase change of:
 - (1) $\frac{\pi}{2}$

(2) π

(3) $\frac{3\pi}{2}$

- $(4) 2\pi$
- The ratio of adiabatic to isochoric pressure coefficient of expansion of a gas is 42. $\left(\gamma = \frac{C_p}{C_p}\right)$:
 - $(1) \gamma$

- $(2) \frac{\gamma}{\gamma + 1}$ $(4) \frac{1}{\gamma}$
- (3) $\frac{\gamma}{\gamma-1}$

- Which of the following is called first latent heat equation ? (where symbols have 43. usual meaning)
 - (1) $\frac{dP}{dT} = \frac{L}{T(V_0 V_1)}$
 - (2) $\frac{dP}{dT} = \frac{LT}{(V_2 V_1)}$
 - (3) $\frac{dP}{dT} = \frac{L(V_2 V_1)}{T}$
 - (4) $\frac{dP}{dT} = \frac{T(V_2 V_1)}{I}$
- Which of the following is *not* a thermodynamical potential? 44.
 - (1) Internal energy
 - (2) Entropy
 - (3) Enthalpy
 - (4) Helmholtz free energy

10	of T Kelvin does 6R Joule
45.	One mole of an ideal gas at an initial temperature of T Kelvin does 6R Joule work adiabatically. If the ratio specific heats of this gas at constant pressure at constant volume is 5/3, the final temperature of the gas will be:
	(1) (T+4) K
	(2) (T-4) K
	(3) (T+10) K
	(4) (T-l0) K
46.	When a gas passes through a porous plan heating effect takes place:
	(1) If temperature of the gas is less than its temperature of inversion
	(2) If temperature of the gas is equal to its temperature of inversion
	(3) If temperature of gas is more than its temperature of inversion
	(4) None of the above
47.	Which of the following is scientific language of computer?
	(1) PASCAL
	(2) FORTRAN
	(3) BASIC
	(4) COBOL
48.	During an adiabatic research to
	During an adiabatic reversible process, the entropy: (1) increases
	(2) decreases
	(3) first increases then decreases
	(4) remains constant
49.	What is the efficiency of a Carnot's engine working between the steam point and the ice point?
	(1) 26.81 % (2) 32.2004
	(2) 33.29%
	(3) 43.47%

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50	O. An oscillator consists :	THE PARTY OF THE PROPERTY OF THE PARTY OF TH	
	(a) of a positive feedback	amplifier	
	(b) has noise as the initial	signal	
	(c) consists of a noise sele	eting network	
	(d) consists of a noise inje-	eting network	
	Which of the above stateme	ents are <i>correct</i> ?	
٠,	(1) a & d	(2) b & d	
	(3) a, b & c	(4) b, c & d	
51.	What should be the velocity to that of a photon of wavel	of an electron so that its linear momentum becomes equal ength 10 Å?	1
	(1) $3 \times 10^8 \mathrm{ms}^{-1}$	(2) $3 \times 10^7 \text{ms}^{-1}$	
	(3) $7.27 \times 10^6 \text{ms}^{-1}$	(4) $7.27 \times 10^5 \text{ms}^{-1}$	
52.		rom rest through a potential difference of 200 v. If e/m for the speed acquired by the electron will be:	r
	(1) $8 \times 10^6 \text{ms}^{-1}$	(2) $8 \times 10^5 \text{ms}^{-1}$	
	(3) $5.656 \times 10^6 \text{ms}^{-1}$	(4) $5.656 \times 10^5 \text{ms}^{-1}$	
53.	According to Debye theo proportional to:	ry, the specific heat of solids at low temperature is	S
	(1) T^0	(2) T	
	(3) T^2	(4) T^3	
54.	Which of the following is no	t correct with regard to Debye approximation?	
	(1) Debye theory obeys Dou	long and Petit's law at high temperatures.	

- (2) The quantum considerations carry great significance at high temperatures.
- (3) At low temperatures the phonons obey same statistics as that obeyed by photons at all temperatures.
- (4) The specific heat of solids is proportional to T³ at low temperatures.

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(1) 8

(3) 32

56.	How many unit cells are present in a cu	be - shaped ideal crystal of NaCI of mass 1g? 5.5 respectively]
	[Atomic mass of Na and CI are 23 and 3 (1) 1.03×10^{22}	(2) 5.14×10^{21}
	(3) 2.57×10^{21}	$(4) 1.03 \times 10^{21}$
57.	The number of carbon atoms per unit ce	ell of diamond unit cell is:
	(1) 1	(2) 4
	(3) 6	(4) 8
58.	The number of close neighbour in a boo	dy centered cubic lattice of identical sphere is:
	(1) 2	(2) 4
	(3) 6	(4) 8
59	. In face centered cubic unit cell, the edg	ge length is:
	$(1) \frac{4}{\sqrt{2}}r$	$(2) \ \frac{\sqrt{3}}{2}r$
	$(3) \frac{4}{3}r$	(4) 2r
6	The ratio of density of lattice points it is:	n (110) and (111) planes in a simple cubic lattice
	(1) 1:1	(2) 1:2
	(3) $\sqrt{3}:\sqrt{2}$	(4) $\sqrt{2}:\sqrt{3}$
6	1. Voltage gain is highest in:	
	(1) Common base amplifier	(2) Common collector amplifier
	(3) Common emitter amplifier	(4) A Diode in forward bias
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How many space Lattices can be obtained from the different crystal systems?

(2) 14

(4) 230

- **62.** In a common base amplifier, if the emitter current is 2 mA and current gain is 0.99, then base current is:
 - (1) 1.98 mA

(2) 2.02 mA

(3) 0.02 mA

- (4) 0.2 mA
- 63. Which of the following is used for rectifying action?
 - (1) Transistor

(2) Diode

(3) Capacitor

- (4) Inductor
- 64. Which of the following is true in case of a PN junction diode?
 - (1) In forward bias the current flows due to majority charge careers
 - (2) The width of the depletion region decreases in reverse bias
 - (3) The avalanche breakdown takes place in forward bias
 - (4) None of the above
- 65. Charge on a p-type semiconductor is:
 - (1) Positive
 - (2) Negative
 - (3) Zero
 - (4) 10^{-12} coulomb
- 66. The effective mass of an electron in a semiconductor:
 - (1) can never be negative
 - (2) can never be positive
 - (3) can be positive or negative
 - (4) depends on its spin
- 67. An ac generator produces an EMF of amplitude 22 V at a frequency 50 Hz, it is connected to a circuit containing 10 mH inductor. The current in the circuit is:
 - (1) $22 \sin\left(100\pi t + \frac{\pi}{2}\right)$

(2) $22 \sin \left(100\pi t - \frac{\pi}{2}\right)$

(3) $7 \sin \left(100\pi t + \frac{\pi}{2}\right)$

 $(4) 7 \sin\left(100\pi t - \frac{\pi}{2}\right)$

**		a speed equal to 0.5c (c is speed of
68.		light with a speed equal to 0.5c (c is speed of light as seen by the observer in the space ship
	travels with a speed equal to:	
	(1) 0.5c	(2) c
	(3) 1.5c	(4) 2c
		a of Hamolecules will be same as that of No
69.	The temperature at which the average sp molecules at 35°C will be:	ecd of H ₂ molecules will be same as that of N ₂
	(1) 2.5°C	(2) 6.25°C
	(3) -50°C	(4) -251°C
70.	The elastic fatigue distinctly illustrated i	n :
9		
	(1) Iron	(2) Silver
	(3) Quartz	(4) Glass
71.	The Young's modulus of a wire of leng to L/2 and radius to R/2, it's Young's m	th L and radius R is Y. If the length is reduced todulus will be:
	(1) Y/2	(2) Y
-	(3) 2Y	(4) 4Y
72.	Practical value of Poisson's ratio (σ) ca	n be:
	(1) Less than zero	
	(2) Between 0 and 0.5	
	(3) Between –1 and 0.5	
	(4) Greater than 0.5	
73.	The potential energy per unit volume shall be equal to:	for a body strained under a longitudinal strain
	(1) stress × strain	
	(2) stress \times (strain) ²	
	(3) $1/2 \text{ stress} \times (\text{strain})^2$	
	(4) $1/2$ (stress × strain)	
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74	1. The Boltzmann's constant depends on:
	(1) Temperature
	(2) Volume and Temperature
	(3) Pressure, volume and Temperature
. 1	(4) None of the above
75	. The pressure exerted on the walls of the container by a gas is due to the fact that the gas molecules:
	(1) lose their kinetic energy
	(2) stick to the walls
	(3) are accelerated towards the walls
	(4) change their momenta due to collision with the walls
76.	If a moving charge particle passes through region having random magnetic field, there the kinetic energy of the charge particle will:
	(1) Increase
	(2) Decrease
	(3) Remain same
	(4) Increase or decrease depending upon the nature of charge particle
77.	If two long current carrying conductors are placed parallel to each other in free space and current is passing through both the conductors in same directions, then the force between them will be:
	(1) Attractive (2) Repulsive
	(3) No force (4) Can't say anything
70	The area of hysteresis loop for a ferromagnetic material represents:

- (1) The square of magnetism per cycle
- (2) Energy loss per cycle
- (3) Coercivity
- (4) Retentivity

79.

(1) Faraday

(3) Biot-Savart

	(3) distributed equally among its electric and magnetic fields
	(4) radiated out of the circuit
81.	The ratio of the longest wavelength and the shortest wavelength observed in high spectral series of the emission spectrum of hydrogen is:
	(1) 4/3
	(3) 25/1 (4) 36/1
82.	The selection rules for passing back effect are:
	$(1) \Delta m_j = 0$
	(2) $\Delta m_j = 0, \pm 1$
٠,	(3) $\Delta m_j = 0, \pm 1, \Delta m_s = 0$
	(4) $\Delta m_j = 0, \pm 1, \Delta m_s = 0, \pm 1$
83.	The possible values of magnetic quantum number for each <i>l</i> are given by:
	(1) $2l-1$, (2) $2l+1$,
	(3) $l-2$, (4) $l+1$
84	. The splitting of a single line singlet into three component lines in the presence magnetic field is:
	(1) Paschen-Back effect
	(2) Normal Zeeman effect
	(3) Anomalous Zeeman Effect

(2) Ampere

(4) Maxwell

80. A charged capacitor (C) is connected in series with an inductor (L). When the

displacement current reduces to zero, the energy of the LC circuit is:

The concept of displacement current was proposed by:

(1) stored entirely in its magnetic field

(2) stored entirely in its electric field

(4) Joule-Kelvin effect

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85. The possible values of Jz for ${}^{2}D_{3/2}$ state of an electron are :

(1)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(2)
$$\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar; \frac{-3}{2}\hbar$$

(3)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$$

(4)
$$\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar$$

- 86. The full form of laser is:
 - (1) Light Amplification of Stimulated Emission Radiation
 - (2) Light Amplification of Spontaneous Emission Radiation
 - (3) Light Amplification by Spontaneous Emission of Radiation
 - (4) Light Amplification by Stimulated Emission of Radiation
- 87. The coherence length of a laser beam with wavelength 440nm and coherence time 40μs is:
 - (1) 11 Km

(2) 12 Km

(3) 1.1 m

- (4) 1.2 Km
- 88. If the distance between two plane mirrors forming the resonant cavity is 0.3 m, then the difference between frequencies of consecutive modes will be:
 - (1) 500MHz

(2) 100MHz

(3) 5MHz

- (4) IMHz
- 89. The function of Helium atom in the Helium-Neon laser is:
 - (1) to provide energy to the Neon atoms
 - (2) to quench the Neon atoms
 - (3) to make Neon atoms inactive
 - (4) none of the above

8	nahic flash	lamp filled
90.	In ruby laser, the rod is surrounded by a helical photographic flash with:	
	(1) neon	
	(2) xenon	
	(3) aluminum	
	(4) chromium	
91.	The particles describe by antisymmetric wave functions are known as:	
	(1) Photons	
	(2) Fermions	
	(3) Bosons	
	(4) Gravitons	
92	2. In case of Fermi-Dirac statistics, all particles cannot come down to the gration to:	round state du
	(1) Pauli's exclusion principle	
	(2) Heisenberg uncertainty principal	
	(3) Gibb's free energy principle	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	(4) Plank's law	
9	33. If Two stars X and Y emit light of orange and yellow colours, respect temperature will be greater for	ctively, then t
	(1) X	
	(2) Y	
	(3) Both have same temperature	
	(4) Can't say anything	

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- 94. Six distinguishable particles are distributed in two compartments with equal a priori probability. Then the probability of the most probable microstate is:
 - (1) $\frac{15}{32}$

(2) $\frac{15}{64}$

(3) $\frac{5}{16}$

- (4) $\frac{5}{32}$
- **95.** The Fourier transform, F(k) of the function $f(x) = e^{-|x|}$ is:
 - $(1) \ \frac{1}{1+ik}$

 $(2) \ \frac{1}{1-ik}$

(3) $\frac{2}{1+k^2}$

- $(4) \ \frac{1}{1+k^2}$
- 96. If two lenses of focal lengths 9 cm and 3 cm are placed at a certain distance apart to form an achromatic combination, then the distance between the lenses is:
 - (1) 2.25 cm

(2) 4.50 cm

(3) 6 cm

- (4) 12 cm
- **97.** The aberrations produced by the variation of refractive index with wavelength of light are called:
 - (1) Spherical aberrations
 - (2) chromatic aberrations
 - (3) astigmatism
 - (4) none of the above
- 98. Which of the following is the result of varying magnification of rays refracted through different zones of the lens?
 - (1) Coma
 - (2) Astigmatism
 - (3) Hypermetropia
 - (4) Myopia

	are placed to	base
99.	In the construction of Fresnel's biprism two acute angled prisms are placed to	
	Actually, it is constructed as a single prism of obtuse angle of about:	

(1) 180°

(2) 179°

(3) 178°

(4) 177°

100. If the central fringe is displaced to the position, which was occupied by 1st bright fringe on placing a thin mica sheet of thickness 1.2 μm in the path of one of the interfering beams in a biprism arrangement, then the refractive index of mica sheet will be (wavelength of light used is 6000 Å):

(1) 1.4

(2) 1.5

(3) 1.6

(4) 1.7

Total No. of Printed Pages: 21

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	SUBJECT: Physics	10056 Sr. No
Time: 11/4 Hours	Max. Marks: 100	Total Questions : 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)	- / /	(Signature of the Invigilator)
_	THE FOLLOWING INFORMATION	/

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

- 1. All questions are compulsory.
- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. The candidate **must not** do any jough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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- 1. The ratio of the longest wavelength and the shortest wavelength observed in high spectral series of the emission spectrum of hydrogen is:
 - (1) 4/3

(2) 525/376

(3) 25/1

- (4) 36/1
- 2. The selection rules for passing back effect are:
 - (1) $\Delta m_j = 0$
 - (2) $\Delta m_i = 0, \pm 1$
 - (3) $\Delta m_j = 0, \pm 1, \Delta m_s = 0$
 - (4) $\Delta m_1 = 0, \pm 1, \Delta m_s = 0, \pm 1$
- 3. The possible values of magnetic quantum number for each l are given by:
 - (1) 2l-1,

(2) 2l+1,

(3) l-2,

- (4) l+1
- 4. The splitting of a single line singlet into three component lines in the presence of magnetic field is:
 - (1) Paschen-Back effect
 - (2) Normal Zeeman effect
 - (3) Anomalous Zeeman Effect
 - (4) Joule-Kelvin effect
- 5. The possible values of Jz for ${}^2D_{3/2}$ state of an electron are :
 - (1) $\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$
 - (2) $\frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar; \frac{-3}{2}\hbar$
 - (3) $\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{-3}{2}\hbar; \frac{-5}{2}\hbar$
 - (4) $\frac{5}{2}\hbar; \frac{3}{2}\hbar; \frac{1}{2}\hbar; \frac{-1}{2}\hbar$

6. The full form of laser is:

	(1) Light Amplification of Stimulated Emission Radiation
	(2) Light Amplification of Spontaneous Emission Radiation
	(3) Light Amplification by Spontaneous Emission of Radiation
	(4) Light Amplification by Stimulated Emission of Radiation
7.	The coherence length of a laser beam with wavelength 440nm and coherence time 40µs is:
	(1) 11 Km (2) 12 Km
	(3) 1.1 m (4) 1.2 Km
8.	If the distance between two plane mirrors forming the resonant cavity is 0.3 m, then the difference between frequencies of consecutive modes will be:
	(1) 500MHz (2) 100MHz
	(3) 5MHz (4) IMHz
9.	The function of Helium atom in the Helium-Neon laser is:
	(1) to provide energy to the Neon atoms
	(2) to quench the Neon atoms
	(3) to make Neon atoms inactive
	(4) none of the above
10.	In ruby laser, the rod is surrounded by a helical photographic flash lamp filled with:
	(1) neon
	(2) xenon
	(3) aluminum
	(4) chromium
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11. If $\phi = yz$, then its gradient is:

(1) zi + yk

(2) yj + zk

(3) i+j+k

(4) zero

12. The divergence of a position vector is:

(1) Zero

(2) 1

(3) 3

(4) 9

13. A theorem that relates surface integral with the volume integral is called:

- (1) Stocks theorem
- (2) Carnot's theorem
- (3) Greens theorem
- (4) Gauss-divergence theorem

14. If a vector is solenoidal, then:

- $(1) \ \overline{A} = 0$
- (2) $\nabla \cdot \overrightarrow{A} = 0$
- (3) $\nabla \times \overrightarrow{A} = 0$
- (4) $\nabla \cdot \left(\nabla \times \overrightarrow{A} \right) = 0$

15. A disc, ring and sphere of the same radius are allowed to roll down an inclined plane from the same height without slipping, which one has highest kinetic energy?

- (1) Disc
- (2) Ring
- (3) Sphere
- (4) All have same kinetic energy

- 16. The rate of change of linear momentum with respect to time is equal to:
 - (1) Torque
 - (2) Angular velocity
 - (3) Force
 - (4) Power
- 17. If the moment of inertia for a solid sphere about any diameter is 2/5MR², then the moment of Inertia of the same sphere about a tangent is:
 - (1) $2/5 MR^2$
 - (2) $3/5 \text{ MR}^2$
 - (3) 4/5 MR²
 - $(4) 7/5MR^2$
- 18. The ice skaters, ballet dancers, and dives often use the principle of conservation of:
 - (1) Mass and energy
 - (2) Linear momentum
 - (3) Angular momentum
 - (4) All of the above
- 19. The Lagrangian of an Atwood's machine is:

(1)
$$\frac{1}{2} (m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(2)
$$\frac{1}{2}(m_1+m_2)\dot{x}^2+\frac{1}{2}(m_1-m_2)gx-V_0$$

(3)
$$(m_1 + m_2) \dot{x}^2 + (m_1 - m_2) gx - V_0$$

(4)
$$\frac{1}{2}(m_1+m_2)\dot{x}^2+(m_1+m_2)gx-V_0$$

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20.		rolling down without sleeping on an inclined number of generalized coordinate required to
	(1) 1	(2) 2
	(3) 4	(4) 6
21.	Voltage gain is highest in:	
	(1) Common base amplifier	
	(2) Common collector amplifier	
	(3) Common emitter amplifier	
	(4) A Diode in forward bias	
22.	then base current is:	itter current is 2 mA and current gain is 0.99.
	(1) 1.98 mA	
	(3) 0.02 mA	(4) 0.2 mA
23.	Which of the following is used for rectif	ying action?
·	(1) Transistor	
feat d	(2) Diode of the part of the p	so the employment of the company of
	(3) Capacitor	the state of the s
	(4) Inductor	
24.	Which of the following is true in case o	f a PN junction diode?
	(1) In forward bias the current flows du	e to majority charge careers
	(2) The width of the depletion region de	ecreases in reverse bias
	(3) The avalanche breakdown takes pla	ce in forward bias
	(4) None of the above	

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25	Charge	on a	p-type	semiconductor	is	:
20.	Ciluis	011.00	h cy h c	DOLLING ON THE COL		

- (1) Positive
- (2) Negative
- (3) Zero
- (4) 10^{-12} coulomb

26. The effective mass of an electron in a semiconductor:

- (1) can never be negative
- (2) can never be positive
- (3) can be positive or negative
- (4) depends on its spin

27. An ac generator produces an EMF of amplitude 22 V at a frequency 50 Hz, it is connected to a circuit containing 10 mH inductor. The current in the circuit is:

(1)
$$22 \sin \left(100\pi t + \frac{\pi}{2}\right)$$

$$(2) 22 \sin\left(100\pi t - \frac{\pi}{2}\right)$$

$$(3) 7 \sin \left(100\pi t + \frac{\pi}{2}\right)$$

$$(4) 7 \sin\left(100\pi t - \frac{\pi}{2}\right)$$

28. A Space ship is approaching a source of light with a speed equal to 0.5c (c is speed of light). Light coming from the source of light as seen by the observer in the space ship travels with a speed equal to:

- (1) 0.5c
- (2) c
- (3) 1.5c
- (4) 2c

29. The temperature at which the average speed of H₂ molecules will be same as that of N2 molecules at 35°C will be:

$$(3) -50^{\circ}C$$

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30.	The clastic fatigue distinctly i	Ilustrated in :			
	(1) Iron	(2) Silver			
	(3) Quartz	(4) Glass			
31.	The particles describe by anti	symmetric wave functions are known as:			
	(1) Photons	(2) Fermions			
	(3) Bosons	(4) Gravitons			
32.	In case of Fermi-Dirac statist to:	tics, all particles cannot come down to the ground state due			
	(1) Pauli's exclusion princip	le			
	(2) Heisenberg uncertainty principal				
	(3) Gibb's free energy princ	iple			
	(4) Plank's law				
33.	temperature will be greater f	light of orange and yellow colours, respectively, then the			
	(1) X				
	(2) Y				
	(3) Both have same temper	ature			
	(4) Can't say anything				
34	 Six distinguishable particle probability. Then the proba 	es are distributed in two compartments with equal a prior bility of the most probable microstate is:			
	(1) $\frac{15}{32}$	(2) $\frac{15}{64}$			

(4) $\frac{5}{32}$

(3) $\frac{5}{16}$

 $(1) \ \frac{1}{1+ik}$

 $\frac{1}{1-ik}$

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(3) $\frac{2}{1+k^2}$

(4) $\frac{1}{1+k^2}$

36. If two lenses of focal lengths 9 cm and 3 cm are placed at a certain distance apart to form an achromatic combination, then the distance between the lenses is:

(1) 2.25 cm

(2) 4.50 cm

(3) 6 cm

(4) 12 cm

37. The aberrations produced by the variation of refractive index with wavelength of light are called:

- (1) Spherical aberrations
- (2) chromatic aberrations
- (3) astigmatism
- (4) none of the above

38. Which of the following is the result of varying magnification of rays refracted through different zones of the lens?

- (1) Coma
- (2) Astigmatism
- (3) Hypermetropia
- (4) Myopia

39. In the construction of Fresnel's biprism two acute angled prisms are placed to base. Actually, it is constructed as a single prism of obtuse angle of about:

(1) 180°

(2) 179°

(3) 178°

(4) 177°

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40.	If the central fringe is displaced to the position, which was occupied by 1st bright fringe on placing a thin mica sheet of thickness 1.2 μ m in the path of one of the interfering beams in a biprism arrangement, then the refractive index of mica sheet will be (wavelength of light used is 6000 Å):			
	(1) 1.4	(2) 1.5		
	(3) 1.6	(4) 1.7		
41.	What should be the velocity of	fan electron so that its linear momentum becomes equal		

41. What should be the velocity of an electron so that its linear momentum becomes equal to that of a photon of wavelength 10 Å?

(1)
$$3 \times 10^8 \,\mathrm{ms}^{-1}$$

(2)
$$3 \times 10^7 \text{ms}^{-1}$$

(3)
$$7.27 \times 10^6 \text{ms}^{-1}$$

(4)
$$7.27 \times 10^5 \text{ms}^{-1}$$

42. An electron is accelerated from rest through a potential difference of 200 v. If e/m for electron is 1.6×10^{11} C/Kg, the speed acquired by the electron will be:

(1)
$$8 \times 10^6 \text{ms}^{-1}$$

(2)
$$8 \times 10^5 \text{ms}^{-1}$$

(3)
$$5.656 \times 10^6 \text{ms}^{-1}$$

(4)
$$5.656 \times 10^5 \text{ms}^{-1}$$

43. According to Debye theory, the specific heat of solids at low temperature is proportional to:

(1)
$$T^0$$

$$(2)$$
 T

(3)
$$T^2$$

(4)
$$T^3$$

44. Which of the following is not correct with regard to Debye approximation?

- (1) Debye theory obeys Doulong and Petit's law at high temperatures.
- (2) The quantum considerations carry great significance at high temperatures.
- (3) At low temperatures the phonons obey same statistics as that obeyed by photons at all temperatures.
- (4) The specific heat of solids is proportional to T³ at low temperatures.

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	(1) 8	(2) 14
	(3) 32	(4) 230
46.		be - shaped ideal crystal of NaCl of mass 1g (5.5, respectively)
	$(1) 1.03 \times 10^{22}$	$(2) \ 5.14 \times 10^{21}$
	$(3) \ \ 2.57 \times 10^{21}$	$(4) 1.03 \times 10^{21}$
47.	The number of carbon atoms per unit cel	l of diamond unit cell is:
	(1) 1	(2) 4
	(3) 6	(4) 8
48.	The number of close neighbour in a bod	y centered cubic lattice of identical sphere is:
	(1) 2	(2) 4
	(3) 6	(4) 8
49.	In face centered cubic unit cell, the edge	e length is:
	$(1) \frac{4}{\sqrt{2}}r$ $(3) \frac{4}{3}r$	$(2) \ \frac{\sqrt{3}}{2}r$
	(3) $\frac{4}{3}r$	(4) 2r
50	The ratio of density of lattice points in is:	(110) and (111) planes in a simple cubic lattic
	(1) 1:1	(2) 1:2
	(3) $\sqrt{3}:\sqrt{2}$	(4) $\sqrt{2}:\sqrt{3}$
51	. The energy of the lowest state in one di	mensional box of length a is:
	(1) Zero	$(2) \frac{h}{4ma^2}$
	$(3) \frac{h}{8ma^2}$	$(4) \frac{h^2}{8ma^2}$

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How many space Lattices can be obtained from the different crystal systems?

(2) 14

52. The wavefunction of a particle is given by:

$$\psi = Ae^{-kx} \text{ for } 0 < x < \infty$$
$$= 0 \qquad \text{for } -\infty < x < 0$$

The value of Λ is:

(1) $\sqrt{\frac{k}{2}}$

(2) \sqrt{k}

 $(3) \sqrt{\frac{2}{k}}$

 $(4) \ \sqrt{\frac{1}{k}}$

53. In one dimensional potential box of length a, the probability of finding a particle will be maximum at:

(1) Zero

(2) $\frac{a}{4}$

(3) $\frac{a}{2}$

(4) a

54. According to Schrödinger, a particle is equivalent to:

- (1) A sound wave
- (2) A wave packet
- (3) A light wave
- (4) A single wave

55. An eigenfunction of an operator $\frac{d^2}{dx^2}$ is e^{ax} . The corresponding eigenvalue will be:

(1) 1

(2) $\alpha^{0.5}$

 $(3)^{\alpha}$

(4) α^2

56. If an electron, a proton, and a neutron have same de-Broglie wavelength, then which particle has greater velocity?

- (1) Election
- (2) Proton
- (3) Neutron
- (4) All have same velocity

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(1) 1:2

(3) 2:1

58.	The linear momentum of a photon with v	veavelength λ will be:
	(1) Zero	(2) $\frac{h}{\lambda}$
	$(3) \frac{h}{\lambda^2}$	(4) $\frac{h}{c\lambda}$
59.	The threshold wavelength of sodium metal is:	netal is 6800 Å. The work function of sodium
	(1) 0.91 eV	(2) 1.82eV
	(3) 2.27eV	(4) 3.64eV
60.	If the uncertainty in the position of an its momentum will be:	electron is 1 Å, then the value of uncertainty in
	(1) $6.6 \times 10^{-34} \text{Kgms}^{-1}$	(2) $2.2 \times 10^{-34} \text{Kgms}^{-1}$
	(3) $3.33 \times 10^{-24} \text{Kgms}^{-1}$	(4) $1.03 \times 10^{-24} \text{Kgms}^{-1}$
61.	The set of Miller Indices for a plane is:	which cuts off intercepts in the ratio 2a:4b:1c
	(1) (214)	(2) (241)
i pira	(3) (124)	(4) (142)
62.	If a plane makes intersects of 2, 1 orthorhombic crystal with a:b:c = 3:2:	and 0.5 Å on the crystallographic axes of ar , then the Miller indices of this plane are:
	(1) (421)	(2) (344)
	(3) (433)	(4) (321)
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57. If an α -particle and a proton have same kinetic energy, wavelengths of the α - particle and the proton will be

(2) 1:4

(4) 4:1

then the ratio

- 63. Which of the following has the least packing fraction?
 - (1) Simple cubic structure
 - (2) Body centered cubic structure
 - (3) Face centered cubic structure
 - (4) Diamond structure

64. The volume of the primitive unit cell of fcc structure with a lattice constant a is:

(1)
$$\frac{a^3}{8}$$

(2)
$$\frac{a^3}{4}$$

(3)
$$\frac{a^3}{2}$$

(4)
$$a^3$$

- 65. Which of the following is *not* true regarding wavelength of X-rays used in X-ray diffraction method?
 - (1) When the wavelength of the X-rays is much smaller than the interplanar spacing then the X-rays are diffracted through angles which are too smart to be measured experimentally.
 - (2) X-rays having wavelength equal to the interplanar spacing are appropriate for X-ray diffraction
 - (3) X-rays having wavelength just greater than twice the interplanar spacing are most appropriate for x-ray diffraction
 - (4) Both (1) &(2).
- 66. The wavelength corresponding to the maximum intensity emitted by a body is:
 - (1) directly proportional to the temperature of the body
 - (2) inversely proportional to the temperature of the body
 - (3) directly proportional to the 4th power of the temperature of the body
 - (4) inversely proportional to the 4th power of the temperature of the body

67.	The phenomenon known as Bose-Einstein co	ndensation	was	invoked	by	F. I	ondon	to
	explain:							

- (1) the free electron theory
- (2) superfluidity exhibited by liquid ³He
- (3) the Planck's radiation law
- (4) London equation

68. Which of the following statistics is classical statistics?

- (1) Maxwell-Boltzmann statistics
- (2) Bose-Einstein statistics
- (3) Fermi-Dirac statistics
- (4) Both (1) and (3)

69. The minimum volume of phase space cell in Fermi-Dirac statistics is equal to:

(1) h^3

(2) h^3

(3) zero

 $(4) \frac{h^3}{c}$

70. Stefan's constant depends upon:

- (1) Energy radiated per unit area per second
- (2) Temperature of the black body
- (3) Both (1)&(2)
- (4) Does not depend upon (1)&(2)

71. According to Lloyd's single mirror experiment, a light wave after reflection from an optically denser medium undergoes a phase change of:

 $(1) \frac{\pi}{2}$

(2) π

(3) $\frac{3\pi}{2}$

(4) 2π

72. The ratio of adiabatic to isochoric pressure coefficient of expansion of a gas is (C_n)

$$\left(\gamma = \frac{C_p}{C_{\nu}}\right):$$

(1) γ

(2)
$$\frac{\gamma}{\gamma+1}$$

 $(3) \frac{\gamma}{\gamma - 1}$

$$(4) \frac{1}{\gamma}$$

73. Which of the following is called first latent heat equation? (where symbols have usual meaning)

 $(1) \frac{dP}{dT} = \frac{L}{T(V_2 - V_1)}$

$$(2) \ \frac{dP}{dT} = \frac{LT}{(V_2 - V_1)}$$

 $(3) \frac{dP}{dT} = \frac{L(V_2 - V_1)}{T}$

$$(4) \frac{dP}{dT} = \frac{T(V_2 - V_1)}{L}$$

- 74. Which of the following is *not* a thermodynamical potential?
 - (1) Internal energy
 - (2) Entropy
 - (3) Enthalpy
 - (4) Helmholtz free energy
- 75. One mole of an ideal gas at an initial temperature of T Kelvin does 6R Joule of work adiabatically. If the ratio specific heats of this gas at constant pressure and at constant volume is 5/3, the final temperature of the gas will be:
 - (1) (T+4) K
 - (2) (T-4) K
 - (3) (T+10) K
 - (4) (T-l0) K

(4) None of the above

77.	Which of the following is scientific language of computer?
	(1) PASCAL
	(2) FORTRAN
	(3) BASIC
	(4) COBOL
78.	During an adiabatic reversible process, the entropy:
70.	(1) increases
	(2) decreases
	(3) first increases then decreases
	(4) remains constant
79.	What is the efficiency of a Carnot's engine working between the steam point and tice point?
	(1) 26.81 % (2) 33.29%
	(3) 43.47% (4) 100%
80.	An oscillator consists: (a) of a positive feedback amplifier
7.	(b) has noise as the initial signal
	(c) consists of a noise selecting network
	(d) consists of a noise injecting network
	Which of the above statements are <i>correct</i> ?
	(1) a & d (2) b & d
	(3) a, b & c (4) b, c & d
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When a gas passes through a porous plan heating effect takes place:

(1) If temperature of the gas is less than its temperature of inversion

(2) If temperature of the gas is equal to its temperature of inversion

(3) If temperature of gas is more than its temperature of inversion

- 81. The width of the plateau region in a GM counter depends upon:
 - (1) Type of radiation
 - (2) Energy of radiation
 - (3) Both (1) and (2)
 - (4) None of the above
- 82. Which of the following is a better material for shielding of Beta radiations?
 - (1) Aluminum
 - (2) Lead
 - (3) Platinum
 - (4) Bismuth
- 83. The reaction time for a direct nuclear reaction is of the order of:
 - (1) 10^{-10} second
 - (2) 10^{-15} second
 - (3) 10^{-20} second
 - (4) 10^{-30} second
- 84. Which of the following is not true about Alpha emission?
 - (1) The atomic number of parent nucleus decreased by 2 after Alpha mission.
 - (2) The mass number of parent nucleus decreased by 4 after Alpha mission.
 - (3) The Alpha emission spectrum is a continuous spectrum.
 - (4) The most energetic Alpha particles are emitted from Polonium-212.
- 85. The energy of a thermal neutron at 27°C is:
 - (1) 0.026eV
 - (2) 0.26eV
 - (3) 2.6eV
 - (4) 26eV

86. The density of the nucleus is of the order of:

(1) 10^{12}Kgm^{-3}

(3) 10^{22} Kgm^{-3}

87.	Beta decay is a consequence o	f:	
	(1) strong nuclear force	1.1	The state of the s
	(2) electromagnetic force		e productions
	(3) weak nuclear force		
	(4) gravitational force		the distribution
88.	The number of electron-ion pagas having ionization potential	irs created by a Gamma rac equal to 25 V is:	liation of energy 1 MeV;
	(1) 6.4×10^6	(2) 6.4×10^4	Office and the second
•	(3) 4×10^6	(4) 4×10^4	i omens i e jaj
89.	The minimum energy of photor	n required for pair productio	n is:
	(1) 1.022 eV		
	(2) 1.022 KeV	The same of the same of the same	missionale soften to
	(3) 1.022 MeV	ar amerika ng mga k	South Strates
	(4) 511 KeV		northern Pigg.
90.	In terms of Redburg's constant ((R), the wave number of firs	t Balmer line is:
	(1) R	는 경험이 가지 것이 없는 데 크린 함 도움 이 되었습니다. 한 영화를 되었습니다.	Tally and the second
	(2) 3R/4		abata a sa
((3) 5R/36		
, ((4) 8R/9		
91. T	The Young's modulus of a wire o L/2 and radius to R/2, it's Yo	of length L and radius R is ung's modulus will be:	Y. If the length is reduc
• • • (1) Y/2	(2) Y	A A
(:	3) 2Y	(4) 4Y	
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(2) 10^{17}Kgm^{-3}

(4) $10^{27} \, \text{Kgm}^{-3}$

- 92. Practical value of Poisson's ratio (σ) can be:
 - (1) Less than zero
 - (2) Between 0 and 0.5
 - (3) Between 1 and 0.5
 - (4) Greater than 0.5
- 93. The potential energy per unit volume for a body strained under a longitudinal strain shall be equal to:
 - (1) stress × strain
 - (2) stress \times (strain)²
 - (3) $1/2 \text{ stress} \times (\text{strain})^2$
 - (4) 1/2(stress × strain)
- 94. The Boltzmann's constant depends on:
 - (1) Temperature
 - (2) Volume and Temperature
 - (3) Pressure, volume and Temperature
 - (4) None of the above
- 95. The pressure exerted on the walls of the container by a gas is due to the fact that the gas molecules:
 - (1) lose their kinetic energy
 - (2) stick to the walls
 - (3) are accelerated towards the walls
 - (4) change their momenta due to collision with the walls
- **96.** If a moving charge particle passes through region having random magnetic field, then the kinetic energy of the charge particle will:
 - (1) Increase
 - (2) Decrease
 - (3) Remain same
 - (4) Increase or decrease depending upon the nature of charge particle

20		
97.	If two long current carrying conductors and current is passing through both the between them will be:	are placed parallel to each other in free space conductors in same directions, then the force
A	(1) Attractive	(2) Repulsive
	(3) No force	(4) Can't say anything
98.	The area of hysteresis loop for a ferroma	ignetic material represents:
	(1) The square of magnetism per cycle	
	(2) Energy loss per cycle	gr 198
	(3) Coercivity	
	(4) Retentivity	

The concept of displacement current was proposed by: 99.

- (1) Faraday
- (2) Ampere
- (3) Biot-Savart
- (4) Maxwell

A charged capacitor (C) is connected in series with an inductor (L). When the displacement current reduces to zero, the energy of the LC circuit is:

- (1) stored entirely in its magnetic field
- (2) stored entirely in its electric field
- (3) distributed equally among its electric and magnetic fields
- (4) radiated out of the circuit

	Answer keys of M.Sc	:.(Physics) entrance	exam dated 15.07.2024	
Q. NO.	A	В	С	D ,
1	4	3	1	3
2	1	3	2	3
3	3	2	4	2
4	3	1	2	2
5	1	3	3	2
6	2	3	2	4
7	3	4	2	2
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34 35	2	2	4	3
	3	4	3	3
36			4	2
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38	4	1		2
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41	1	1	2 3	4
42	2	3		1
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46	2	3	3	3
47	2	4	2	4
48	1	3	4	4
49	2	1	1	1
50	4	2	1	3

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	Answer keys of M.Sc	.(Physics) entrance	exam dated 15.07.2024	
Q. NO.	A	В	С	D
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100	2	3	2	1