Examination March/May 2021

B.Sc. S.Y (Sem-III)

M21_2120 Physics -VIII Modern and Nuclear Physics

Time: Thirty Minutes   Max. Marks: 50

PRN:

Candidate's Seat Number:

Candidate's Seat Number in words:

Center Name: Date:

Candidate's Signature: Invigilator's Signature:

Instructions:

i) Attempt all questions

ii) Use blue ball point pens, and avoid gel pens and fountain pens for filling the sheets.

iii) Multiple answers in single question will be treated as invalid response

1   e/m of Photoelectron was determined by

(A) Einstein   (B) Hallwachs   (C) Hertz   (D) Lenard

Answer: ☐

2   If intensity of incident light is doubled then

(A) Maximum Photoelectric   (B) Maximum Photoelectric   (C) Stopping potential is doubled   (D) Stopping potential is halved
current is doubled.   current is halved.

Answer: ☐

3   Reproduction of sound from photo-film is achieved using

(A) Photo emissive cell   (B) Photo-voltaic cell   (C) Photo-conductive cell   (D) Photo Multiplier

Answer: ☐

4   If 'h' is Plank's constant then slope of the graph of maximum energy of Photoelectron against frequency of light is

(A) h^2 (B) $2h^2$ (C) $2h$ (D) h

Answer: ☐

5   A millimeter in the circuit of photocell measures

(A) number of electrons released   (B) energy of photon   (C) velocity of photoelectrons   (D) none of the above
per second

Answer: ☐

6   The kinetic energy of photo electron is just zero at

(A) Threshold frequency   (B) Boundary condition   (C) Lower level   (D) None of above

Answer: ☐

7   Wavelength of X ray is ....than wavelength of visible light

(A) Longer   (B) Shorter   (C) Similar   (D) None above

swer: ☐

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8 K series radiation is high energetic so they are called as

(A) Soft X-Ray (B) Hard X-Ray (C) Continuous X-Ray (D) None of these

Answer: ☐

9 The absorption coefficient of X-rays for a given wavelength is larger for

(A) Lithium (B) Copper (C) Aluminum (D) Lead

Answer: ☐

10 For the production of the characteristic K_β X-rays the electron transition is

(A) n=2 to n=1 (B) n=3 to n=2 (C) n=3 to n=1 (D) n=4 to n=2

Answer: ☐

11 When high speed electrons hit a target

(A) Only continuous X-rays are emitted (B) Only heat is produced (C) Heat is produced and simultaneously continuous and characteristics X-rays are emitted (D) Only continuous and characteristic X-rays are produced

Answer: ☐

12 In nuclear fission of one nucleus of uranium ------ amount of energy is released

(A) 200eV (B) 200MeV (C) 200 Joule (D) 200 erg

Answer: ☐

13 Process of fission is responsible for release of energy

(A) from Sun (B) In hydrogen bomb (C) In atom bomb (D) In chemical reaction

Answer: ☐

14 Control rods used in nuclear reactors are made of

(A) Stainless steel (B) Graphite (C) Cadmium (D) Plutonium

Answer: ☐

15 The volume of the nucleons is proportional to

(A) atomic number (B) number of neutrons (C) number of protons (D) mass number

Answer: ☐

16 In the nuclear reactors the moderators are used to

(A) Slow down the neutrons (B) Generate neutrons (C) Accelerate the neutrons (D) Absorb the neutrons

Answer: ☐

17 Nucleons are held together by

(A) electrostatic force (B) nuclear force (C) magnetic force (D) gravitational force

Answer: ☐

18 The forces between nucleons are ....

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(A)repulsive   (B)sometime attractive   (C)sometime repulsive   (D)attractive

Answer: ☐

---

19 The ionization chamber works on the principle that charged particles passing through the matter remove……from the atoms.

(A)neutrons   (B)electrons   (C)Protons   (D)none of the above,

Answer: ☐

---

20 No magnetic field is necessary for working of

(A)Cyclotron   (B)Betatron   (C)Synchro-cyclotron   (D)Linear accelerator

Answer: ☐

---

21 Which One of the following is an X-Ray generator

(A)Cyclotron   (B)Betatron   (C)Synchro-cyclotron   (D)Linear accelerator

Answer: ☐

---

22 When nuclear radiations pass through the counter, gas ionization is produced. This is the principle of ....

(A)Proportional counter   (B)Flow counter   (C)Geiger Muller counter   (D)Scintillation counter

Answer: ☐

---

23 Cyclotron can be used in

(A)Source of high energy beam for a nuclear physics experiment   (B)Particle therapy to treat cancer   (C)Produce short-lived positron-emitting isotopes for PET imaging   (D)All the above

Answer: ☐

---

24 The difference in measured mass M & the mass number A is called.............................

(A)Plank's constant   (B)1 a.m.u.   (C)the mass defect   (D)atomic mass

Answer: ☐

---

25 If multiplication factor K>1 then chain reaction will be

(A)critical   (B)Supercritical   (C)Subcritical   (D)building up

Answer: ☐

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CENTRE NO 141

B.Sc. S.Y (Sem-III)

M21_2119 Physics -VII Mathematical Statistical Physics and Relativity

Time: Thirty Minutes　　　　　　　　　　　　　　　　　　**Max. Marks: 50**

PRN:

Candidate's Seat Number:

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Center Name:　　　　　　　　　　　　　　　　　　　　　Date:

Candidate's Signature:　　　　　　　　　　　　　　　　　Invigilator's Signature:

Instructions:
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1 *If* $\lim_{x \to a^-} f(x) = L_1$, *then the number* L_1 *is said to be*

(A) Left hand limit of f(x) as x approaches a
(B) One sided limit of f(x) as x approaches a
(C) Right hand limit of f(x) as x approaches a
(D) None of these

Answer: ☐

2 .... involves only one independent variable

(A) Ordinary differential equation
(B) Mixed partial differential equation
(C) Partial differential equation
(D) None of these

Answer: ☐

3 If $y = \sin x^2$, then dy/dx using chain rule is

(A) $-2x \sin x^2$
(B) $2x \cos x^2$
(C) $2x \sin x^2$
(D) $-2x \cos x^2$

Answer: ☐

4 The process of differentiating a given function successively n times is called as

(A) Exact differentiation
(B) Total differentiation
(C) Successive differentiation
(D) None of these

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Answer: ☐

5   $dF = F_x dx + F_y dy + F_z dz$ represents ....of three independent variables x, y & z

(A) Total differential   (B) Implicit function   (C) Exact differential   (D) Explicit function

Answer: ☐

6   $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ is the condition for ....differentiation

(A) Total   (B) Exact   (C) Successive   (D) None of these

Answer: ☐

7   The order of given differential equation $(x + y)dx = (x - y)dy$ is

(A) 1   (B) 3   (C) 4   (D) 2

Answer: ☐

8   If a card is drawn from a well shuffled pack of 52 cards, the probability for this card to be either a king or a queen is

(A) 2/13   (B) 3/13   (C) 4/13   (D) 5/13

Answer: ☐

9   Thermodynamic probability of a system in equilibrium is

(A) Minimum   (B) Maximum   (C) Zero   (D) None of these

Answer: ☐

10   The three dimensional space in which the location of a particle is completely given by the three position coordinates is known as

(A) Momentum space   (B) Phase space   (C) Position space   (D) None of these

Answer: ☐

11   The equation for Maxwell-Boltzmann law of distribution of speeds among the molecules of a gas is

(A) $n(v)dv = 4\pi N\left(\dfrac{m}{2\pi kT}\right)^{3/2} v^2 e^{mv^2/kT} dv$ (B) $n(v)dv = 4\pi N\left(\dfrac{m}{2\pi kT}\right)^{1/2} v^2 e^{-mv^2/kT} dv$ (C) $n(v)dv = 2\pi N\left(\dfrac{m}{2\pi kT}\right)^{3/2} v^2 e^{-mv^2/kT} dv$ (D)

$n(v)dv = 4\pi N\left(\dfrac{m}{2\pi kT}\right)^{3/2} v^2 e^{-mv^2/kT} dv$

Answer: ☐

---

12 Sterling's formula for large number of particles n is

(A) $\log n! = n\log n + n$ (B) $\log n! = n\log n - n$ (C) $\log n! = n\log n - 2n$ (D) None of these

Answer: ☐

---

13 Maxwell-Boltzmann energy distribution law in general form is given by

(A) $n_i = g_i e^{-\alpha} e^{-\beta E_i}$ (B) $n_i = g_i e^{-\alpha} e^{\beta E_i}$ (C) $n_i = g_i e^{\alpha} e^{-\beta E_i}$ (D) None of these

Answer: ☐

---

14 The wave function of fermions is not ....

(A) Continuous　　　(B) Single Valued　　　(C) Symmetric　　　(D) Differentiable

Answer: ☐

---

15 The energy of a photon in Joules that has a wavelength of 9.0 m is

(A) $6.0*10^{-23}$ J　　　(B) $4.5*10^{25}$ J　　　(C) $2.21*10^{-26}$ J　　　(D) $4.5*10^{-27}$ J

Answer: ☐

---

16 The energy emitted by a black surface should not vary in accordance with

(A) Wavelength　　　(B) Temperature　　　(C) Surface characteristics　　　(D) Time

Answer: ☐

---

17 In how many ways two particles can be arranged in three phase cells according to B − E statistics.

(A) 6　　　(B) 2　　　(C) 7　　　(D) 8

Answer: ☐

---

18 Photons obey the statistics

(A) M - B   (B) F - D   (C) B - E   (D) None of these

Answer: ☐

19 Bosons obey Pauli's exclusion principle.

(A) True   (B) False   (C) Can't say   (D) None of these

Answer: ☐

20 According to the special theory of relativity, physical laws are the same in frames of reference which

(A) Move at uniform velocity   (B) Accelerate   (C) Move in ellipses.   (D) Move in circles

Answer: ☐

21 If 3 kg of a substance is fully converted into energy, how much energy is produced?

(A) $3.7*10^{17}$ J   (B) $2.7*10^{17}$ J   (C) $4.5*10^{17}$ J   (D) $9.3*10^{17}$ J

Answer: ☐

22 According to Galilean transformation t' and t is,

(A) Equal   (B) Not equal   (C) Approximation equal   (D) None of these

Answer: ☐

23 According to Michelson-Morley experiment, the velocity of earth with respect to ether which finally shows that the effect of ether is,

(A) Detectable   (B) Undetectable   (C) Less detected   (D) None of these

Answer: ☐

24 The length contraction becomes appreciable only when

(A) $V = C$ (B) $V \approx C$ (C) $V \neq C$ (D) $V > C$

Answer: ☐

25 According to classical mechanics, the space, time and mass these three fundamental concepts of physics are all

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(A) Absolute and Invariant

(B) Absolute and Variant

(C) Absolute zero

(D) All of these

Answer: ☐

Examination March/May 2021

B.Sc. T.Y (Sem-V)

M21_2115 Physics Paper-XV (Classical & Quantum Mechanics)

Time: Thirty Minutes   Max. Marks: 50

PRN:

Candidate's Seat Number:

Candidate's Seat Number in words:

Center Name: Date:

Candidate's Signature: Invigilator's Signature:

Instructions:

i) Attempt all questions

ii) Use blue ball point pens, and avoid gel pens and fountain pens for filling the sheets.

iii) Multiple answers in single question will be treated as invalid response

1 According to the law of conservation of momentum, if total external force acting on the system is equal to zero then the total linear
   momentum is -------.

(A) Conserved   (B) Non conserved   (C) Zero   (D) ∞

Answer:

2 If torque is not acting on the particle then the momentum is --------.

(A) Variable   (B) Constant   (C) Zero   (D) None of these

Answer:

3 The constraints involved when particle is restricted to move along a curve of surface are

   ----------.

(A) Holonomic   (B) Non-holonomic   (C) Conservative   (D) Dissipative

Answer:

4 Constraints are applied in a system -----------.

(A) equal to number of degrees of   (B) 3N degrees of freedom   (C) to reduce the number of   (D) to increase the number of
    freedom   degrees of freedom   degrees of freedom

Answer:

5 $\sum_{i=1}^{N} \left(F_i^a - \dot{P}_i \right) \delta r_i = 0$, this equation represents --------------.

(A) Virtual work done   (B) D'Alembert's principle   (C) Lagrange's equation   (D) Holonomic constraints

Answer:

6 $\dfrac{d}{dt}\dfrac{\partial L}{\partial \dot{q}_k} - \dfrac{\partial L}{\partial q_k} = 0$, represents Lagrange's equation in ------ system.

(A) General   (B) Linear   (C) Conservative   (D) Angular

Answer:

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7 The equation of motion of simple pendulum is, ----------.

(A) $\theta + \frac{l}{g}\sin\theta = \infty$ (B) $\theta + \frac{g}{l}\sin\theta = 0$ (C) $\theta + \frac{g}{l}\sin\theta = 0$ (D) $\theta + \frac{g}{l}\cos\theta = 0$

Answer: ☐

8 The absorptive power of perfectly black body is --------.

(A) 0.5   (B) 1   (C) 0   (D) ∞

Answer: ☐

9 In the black body radiation, area under curve is directly proportional to --------- power of temperature.

(A) 5th   (B) 2nd   (C) 4th   (D) 6th

Answer: ☐

10 The linear momentum of photon in terms of wave vector is -------.

(A) $P = \hbar \mid \rightarrow K \mid$ (B) $P = \frac{h}{2}$ (C) $P = h \mid \rightarrow K \mid$ (D) $P = hk$

Answer: ☐

11 $\lambda_m \ \alpha \ \frac{1}{T}$ represents, ---------.

(A) Plank's law   (B) Wein's law   (C) Rutherford's law   (D) Rayleigh-Jeans law

Answer: ☐

12 Rayleigh- Jean's formula agrees with ------------- region.

(A) average wavelength   (B) shorter wavelength   (C) longer wavelength   (D) none of these

Answer: ☐

13 Which of the following phenomenon supports the quantum nature of light?

(A) Interference   (B) Polarization   (C) Compton effect   (D) Diffraction

Answer: ☐

14 The De Broglie wavelength is represented by -----------.

(A) $\lambda = \frac{h}{mv}$ (B) $\lambda = \frac{h^2}{mv}$ (C) $\lambda = \frac{h}{mv}$ (D) $\lambda = \frac{h}{mv^2}$

Answer: ☐

15 The Quantum is basic unit of -----------.

(A) Work   (B) Energy   (C) Momentum   (D) Pressure

Answer: ☐

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16 The correct statement of the Heisenberg's uncertainty principle is ---------.

(A) $\Delta p \Delta x \geq \frac{\hbar}{2}$ (B) $\Delta E \Delta t \geq \frac{\hbar}{2}$ (C) $\Delta L \Delta \theta \geq \frac{\hbar}{2}$ (D) All of above

Answer: ☐

17 The De Broglie wavelength of material particles, which are in thermal equilibrium at temperature T is ------------.

(A) $\dfrac{h}{\sqrt{3mKT}}$ (B) $\dfrac{\hbar}{\sqrt{mKT}}$ (C) $\dfrac{h}{KT}$ (D) $\dfrac{h}{\sqrt{2mKT}}$

Answer: ☐

18 The relation between the group velocity vg and phase velocity u is ....

(A) $v_g = u - \lambda$ (B) $v_g = u - \lambda \dfrac{du}{d\lambda}$ (C) $v_g = \dfrac{du}{d\lambda}$ (D) $u v_g = c$

Answer: ☐

19 Davisson and Germer experiment are related to ----------.

(A) Interference   (B) Reflection   (C) Diffraction   (D) Polarisation

Answer: ☐

20 The wave function ψ must be -----------.

(A) Single valued   (B) Finite   (C) continuous   (D) all above

Answer: ☐

21 The Probability density is defined as ------------.

(A) $P = \Psi$ (B) $P = |\Psi|^2$ (C) $P = \dfrac{\Psi}{2}$ (D) $P = 5\Psi$

Answer: ☐

22 A rule by means of which a given function can be changed into another function is called as ---------.

(A) Operator   (B) Function   (C) Energy   (D) Eigen value

Answer: ☐

23 For a free particle, the potential energy is --------.

(A) 1   (B) 0   (C) -1   (D) ∞

Answer: ☐

24 The energies of a particle in a 1-dimensional box are ----------.

(A) single valued   (B) continuous   (C) Discrete   (D) Kinetic energy

Answer: ☐

25 The Schrödinger's time dependent wave equation can be representing in the form of operator as --------.

(A) $H\Psi = 1$ (B) $H\Psi = A$ (C) $H = EK$ (D) $H\Psi = E\Psi$

Examination March/May 2021

B.Sc. T.Y (Sem-V)

M21_2116 Physics Paper- XVI(Electrodynamics)

Time: Thirty Minutes   Max. Marks: 50

PRN:

Candidate's Seat Number:

Candidate's Seat Number in words:

Center Name: Date:

Candidate's Signature: Invigilator's Signature:

Instructions:

i) Attempt all questions

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iii) Multiple answers in single question will be treated as invalid response

1 An electric flux through a surface is defined as------- of the surface area and the magnitude of the normal component of the electric field.

(A) dot product   (B) cross product   (C) Sum   (D) Difference

Answer: ☐

2 $\nabla . \vec{E} = \frac{\rho}{\epsilon_0}$ represents ----------.

(A) Divergence theorem   (B) Stokes theorem   (C) Gauss law in differential form   (D) Gauss law in integral form

Answer: ☐

3 Electric lines of force around a positive point charge are always ----------.

(A) radially outwards   (B) along straight line   (C) radially inwards   (D) none of the above

Answer: ☐

4 Which of the following is Poisson's equation?

(A) $\nabla . E = \frac{\rho}{\epsilon_0}$ (B) $\nabla^2 \psi = 0$ (C) $E = -\nabla \psi$ (D) $\nabla^2 \psi = \frac{-\rho}{\epsilon_0}$

Answer: ☐

5 According to Gauss's law, the total flux through any closed surface is equal to ------ times the net charge enclosed by the surface.

(A) $\frac{1}{\mu_0}$ (B) ϵ_0 (C) $\frac{1}{\epsilon_0}$ (D) μ_0

Answer: ☐

6 'Gaussian Pillbox' extending equal distance ---------.

(A) above the plane   (B) *below the plane*   (C) *above ∧ below the plane*   (D) $\grave{c}$

Answer: ☐

7   The electric field E for a point on the uniformly charged solid sphere of

   radius R is equal to -----------.

(A) $\dfrac{\rho}{4\pi R^2 \in}$

(B) $\dfrac{q}{4\pi \in_0 R^2}$

(C) $\dfrac{-p}{4\pi \in_0 R^3}$

(D) $\dfrac{-Q}{4\pi \in_0 R^2}$

Answer: ☐

---

8   Whenever there is a change in the magnetic flux linked with a circuit, an e.m.f. induced in the circuit is known as -------------.

(A) Faraday's first law

(B) Lenz's law

(C) Gauss law

(D) Kirchhoff's law

Answer: ☐

---

9   The unit of inductance is----------.

(A) Volt

(B) Ohm

(C) Ampere

(D) Henry

Answer: ☐

---

10 Lenz's law is a consequence of the conservation of ----------.

(A) Energy

(B) Charge

(C) Momentum

(D) Current

Answer: ☐

---

11 Maxwell's displacement current density is represented as ----------.

(A) $J + \dfrac{\partial \vec{D}}{\partial t}$

(B) $\nabla \cdot \vec{D}$

(C) $\dfrac{\partial \vec{D}}{\partial t}$

(D) None of these

Answer: ☐

---

12 Transformer works on the principle of -------------.

(A) Induced e. m. f.

(B) Mutual inductance

(C) Self-inductance

(D) Mutual &Self inductance

Answer: ☐

---

13 $\nabla \times \vec{H} = \vec{J} + \dfrac{\partial \vec{D}}{\partial t}$ is called as a modified $----¿$

(A) Ampere's law

(B) Gauss law

(C) Faraday's law

(D) None of above

Answer: ☐

---

14 Electromagnetic waves can be --------------------.

(A) reflected

(B) refracted

(C) polarized

(D) All the above

Answer: ☐

---

15 The Poynting vector is ---------- product of electric field vector $\vec{E}$ and magnetic field vector $\vec{H}$.

(A) dot

(B) cross

(C) Both A & B

(D) none of the above

Answer: ☐

---

16 $\vec{\nabla} . \vec{S} + \dfrac{\partial U}{\partial t} = 0$ shows------------.

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(A) Poynting theorem   (B) Maxwell's equation   (C) Greens theorem   (D) equation of continuity

Answer: ☐

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17 Which of thefollowing gives direction of propagation of electromagnetic wave?

(A) $\vec{E} \times \vec{D}$ (B) $\vec{E} \times \vec{B}$ (C) $\vec{H} \times \vec{B}$ (D) $\vec{B} \times \vec{D}$

Answer: ☐

---

18 Calculate the e.m.f., when a coil of 100 turns is subjected to a flux rate of 0.3 tesla/sec.

(A) 3   (B) -30   (C) 300   (D) 1

Answer: ☐

---

19 $n_1 \sin\theta_{1=i n_i} \sin\theta_2$ represents -----------.

(A) Newton's law   (B) Kirchhoff's law   (C) Brewster's law   (D) Snell's law of reflection

Answer: ☐

---

20 The tangential component of electric field $\vec{E}$ is ---------- across the interface.

(A) continuous   (B) discontinuous   (C) normal   (D) tangential

Answer: ☐

---

21 The incident, reflected, refracted waves all lie in the same plane but ---------- to the boundary surface.

(A) different   (B) same   (C) normal   (D) None of these

Answer: ☐

---

22 The tangential component of electric displacement $\vec{D}$ is ---------- across the interface.

(A) continuous   (B) discontinuous   (C) normal   (D) tangential

Answer: ☐

---

23 In case of reflection, the angle of reflection is --------- to the angle of incidence.

(A) greater   (B) smaller   (C) equal   (D) zero

Answer: ☐

---

24 Electromagnetic waves are produced by ---------.

(A) a static charge   (B) a moving charge   (C) an accelerated charge   (D) charged particles

Answer: ☐

---

25 In Electromagnetic wave the phase difference between electric field vector and $\vec{E}$ and magnetic field vector $\vec{B}$ is ---------.

(A) $\frac{\pi}{2}$ (B) π (C) $\frac{2\pi}{3}$ (D) 1

Answer: ☐

Examination March/May 2021

B.Sc. T.Y (Sem-VI)

M21_2005 Physics Paper-XIX (Atomic Molecular Physics & Laser)

Time: Thirty Minutes   **Max. Marks: 50**

PRN:

Candidate's Seat Number:

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Instructions:

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1 In Rutherford's Experiments on Scattering of alpha particles there were few particles that were scattered through ....

(A) Large angles   (B) Small angles   (C)Perpendicular path   (D)Parallel path

Answer:

2 As per the Rutherford's nuclear atom model all positive charges of an atom and most of the mass of the atom are concentrated in the ....

(A) Outer shell   (B) Inner shell   (C)Nucleus   (D)electrons

Answer:

3 Number of spectral lines in hydrogen atom is

(A) 1   (B) 5   (C)10   (D)Infinity

Answer:

4 Which scientist gave the concept of fixed energy levels around the nucleus?

(A) Ernest Rutherford   (B) Neils Bohr   (C)J.J.Thomsan   (D)None of these

Answer:

5 Who discovered the electron?

(A) Rutherford   (B) Chadwick   (C)Thomson   (D)Goldstein

Answer:

6 When an electron jumps from second, third,.. etc., orbits to the first orbit the series of spectral lines obtained is called

(A) Balmer Series   (B) Pfund Series   (C)Lyman Series   (D)Brackett Series

Answer:

7 The two distinct features of the vector atom model are

(A) The electron quantization concept & vibrating electron hypothesis   (B) The spatial quantization concept & spinning electron hypothesis   (C) The spatial electron concept & spinning nucleus hypothesis   (D) None of these

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Answer: ☐

8   No two electrons in an atom can exist in same quantum state. The statement is of ....

(A) The Intensity rules   (B) Zeeman effect   (C) Pauli's exclusion principle   (D) All of the above

Answer: ☐

9   The Zeeman effect is a .... Phenomenon in which .... Lines are affected by an applied magnetic field and split into several components

(A) Magneto optical, spectral   (B) Electromagnetic, spatial   (C) Electric, magnetic   (D) All of the above

Answer: ☐

10 Zeeman Effect is the splitting of spectral line in the presence of _____

(A) Electric Field   (B) Magnetic Field   (C) Inert Environment   (D) Vacuum

Answer: ☐

11 On which of the following levels of hydrogen the spin orbit interaction has no effect

(A) D Level   (B) G Level   (C) X Level   (D) S Level

Answer: ☐

12 Pauli's Exclusion Principle state that two electrons in the same orbits have

(A) Same spins   (B) Different spins   (C) Opposite spins   (D) Verticle spins

Answer: ☐

13 If substance giving rise to band spectrum is heated then the nature of the spectrum is ....

(A) Changed   (B) Increase   (C) Decrease   (D) Intact

Answer: ☐

14 Which of the following statement is true

(A) Raman lines never polarised at all   (B) Raman lines weakly polarised   (C) Ramen lines horizontally polarised   (D) Raman lines strongly polarised

Answer: ☐

15 The energy levels corresponding to electronic energy E_e are known as ....

(A) Magnetic effect   (B) Electric Effect   (C) More Energy   (D) Electronic energy levels

Answer: ☐

16 In Raman spectroscopy, the radiation lies in the ....

(A) Microwave Region   (B) Visible Region   (C) UV Region   (D) X-ray Region

Answer: ☐

17 The selection rule for transmission in rotational spectra is

(A) $\Delta J = 0$ (B) $\Delta J = \pm 1$ (C) $\Delta J = \pm 2$ (D) $\Delta J = \square$

Answer: ☐

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18 In Rayleigh's scattering the scattered light has the -------- frequency

(A) Same   (B) different   (C) less   (D) greater

Answer:

19 LASER stands for

(A) Light Amplification by Simultaneous Emission of Radio

(B) Light Amplification by Sequential Emission of Radar

(C) Light Amplification by Stimulated Emission of Radiation

(D) All of the above

Answer:

20 An atom residing in the lower energy level E1 may absorb the incident photon and jump to excited state E2, this phenomenon known as

(A) Induced absorption   (B) Incident Absorption   (C) Photon Excitation   (D) All of the above

Answer:

21 The process by which atoms raised from the lower level to the upper level is called ………

(A) Energy emission   (B) pumping   (C) Population inversion   (D) Energy state

Answer:

22 Which of the following is not a characteristic of LASERS?

(A) Monochromatic   (B) Coherent   (C) Divergent   (D) Intense

Answer:

23 The relation between Einstein's coefficients is …….

(A) $\frac{B_{21}}{B_{12}} = 1:2$ (B) $\frac{B_{21}}{B_{12}} = 2:1$ (C) $\frac{B_{21}}{B_{12}} = 1$ (D) $\frac{B_{21}}{B_{12}} = 2$

Answer:

24 Which of the following is a unique property of laser?

(A) Directional   (B) Speed   (C) Coherence   (D) Wavelength

Answer:

25 Ruby laser is a ---------

(A) Solid state laser   (B) Gaseous laser   (C) Semiconductor laser   (D) None of these

Answer:

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Examination March/May 2021

B.Sc. T.Y (Sem-VI)

M21_2006 Physics Paper-XX (Non -Conventional Energy Sources and Optical Fiber)

Time: Thirty Minutes   Max. Marks: 50

PRN:

Candidate's Seat Number:

Candidate's Seat Number in words:

Center Name: Date:

Candidate's Signature: Invigilator's Signature:

Instructions:

i) Attempt all questions

ii) Use blue ball point pens, and avoid gel pens and fountain pens for filling the sheets.

iii) Multiple answers in single question will be treated as invalid response

1   Horizontal axis and Vertical axis are the type of..........

(A) Wind mills   (B) Nuclear reactors   (C) Biogas reactor   (D) Solar cell

Answer:

2   Biogas is obtained from.......... source of energy.

(A) Non Renewable   (B) Renewable   (C) Conventional   (D) Non of these

Answer:

3   Non conventional source of energy are.........

(A) Pollution free   (B) Cause pollution   (C) Harmful   (D) Both a and b

Answer:

4   The gas obtained from biomass is ....

(A) Ethane   (B) Methane   (C) Oxygen   (D) Organ

Answer:

5   Wind power is used for..........

(A) Propelling ships   (B) Pumping water   (C) Neither (a) and (b)   (D) Both (a) and (b)

Answer:

6   In vertical axis wind turbine the blades of wind turbine rotate around...........

(A) Vertical axis   (B) Harizontal axis   (C) The axis inclined 45 at degree   (D) None of these

Answer:

7   The solar photovoltaic systems convert solar energy into........

(A) Electric energy   (B) Heat energy   (C) Light energy   (D) Wind energy

Answer:

8   Heat and light generated by the Sun is result of sustained.......

(A) Nuclear fission reactions   (B) Chemical reactions   (C) Nuclear fusion reactions   (D) Other than these

Answer: ☐

9 An electrolyte used in Lead - Acid Battery is.......

(A) Dilute sulphuric acid   (B) Hard water   (C) Acetic acid   (D) Soft water

Answer: ☐

10 A battery converts ....energy into electrical energy.

(A) Light   (B) Sound   (C) Thermal   (D) Chemical

Answer: ☐

11 Barrier potential in semiconductor diode.........

(A) Allows motion of majority charge carriers across the junction.   (B) Opposes motion of majority charge carriers across the junction.   (C) Opposes motion of minority charge carriers across the junction.   (D) None of these

Answer: ☐

12 Which of the following convert chemical energy into electrical energy?

(A) P-NJunction Diode   (B) HAWT   (C) Lead - Acid Battery   (D) Biogas plant

Answer: ☐

13 HPSUV optical fibres are suitable for transmission in the range of.....

(A) 180 m to 800 m   (B) 180 nm to 800 nm   (C) 180 mm to 800 mm   (D) 180 um to 800 um

Answer: ☐

14 Optical fibre is normally made from..........

(A) Coherent glass and Xenon   (B) Copper   (C) Water   (D) Silica glass or plastic

Answer: ☐

15 Optical fibres are used in ....

(A) Electrical system   (B) Communication system   (C) Radio system   (D) None of these

Answer: ☐

16 In optical fibre core is surrounded by ....

(A) Cladding   (B) Jacket   (C) Core   (D) None of these

Answer: ☐

17 Single mode step index fibres are widely used because of ...

(A) Superior transmission quality.   (B) Greatest transmission bandwidth.   (C) Lower losses.   (D) All of these

Answer: ☐

18 Rate of chemical vapor deposition in external CVD technique is

(A) 1-2 gm/min   (B) 1 -2 kg/min   (C) 1 -2 gm/sec   (D) 1-2 gm/hour

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Answer: [   ]

19 Optical fibre laid down underground the road surface is protected by.......

(A) Plastic pipe   (B) HDPE pipes   (C) Cement   (D) Wood jacket

Answer: [   ]

20 During CVD process ....dopants are used.

(A) GeO_2 (B) $G_2 O_2$ (C) P_2O_5 (D) All above

Answer: [   ]

21 The numerical aperture of the fibre produced by External chemical vapor deposition method is ....

(A) 0.4   (B) 0.3   (C) 0.2   (D) 0.5

Answer: [   ]

22 An Axial vapor deposition (AVD) method produces .... fibres.

(A) SI   (B) Grain   (C) GI   (D) Both a and b

Answer: [   ]

23 In internal chemical vapor deposition process, refractive index can be changed by changing .....

(A) Dopant Cocentration   (B) temperature   (C) Reaction time   (D) None of above

Answer: [   ]

24 In internal chemical vapor deposition method, the Outer diameter to core diameter ratio is ....

(A) 3 : 2   (B) 2 : 3   (C) 2 : 4   (D) None of these

Answer: [   ]

25 Which of the following material is used in solar cell?

(A) Barium   (B) Silver   (C) Silicon   (D) Selenium

Answer: [   ]