Examination October 2020

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

2151 Physics Paper-XV (Classical & Quantum Mechanics)

Time: One Hour   **Max. Marks: 25**

Instructions
Solve any 25 questions

1 If no torque is acting a particle then its angular momentum is ……….

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

2 The rate of change of angular momentum is ……….

(A)Moment of Inertia   (B)Torque   (C)Moment of momentum   (D)None of these

3 Constraints applied in a system ……….

(A)Increase the no of degree of freedom (B)Reduce the no. of degree of freedom (C)Equal to no of degree of freedom (D)None of these

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

(A)Holonomic   (B)Non-holonomic   (C)Both a & b   (D)None of these

5 $$\frac{d}{dt}\frac{\partial L}{\partial qj}-\frac{\partial L}{\partial qj}=0$$ Known as……..

(A)Hamiltonion equation of motion (B)Lagrengian Equation of motion for conservative system (C)Newton's equation of motion (D)None of these

6 Atwood's machine is an example of ……. System

(A)Linear   (B)Angular   (C)Conservative   (D)None of these

7 $$\delta w=\sum_{i=1}^{N} F_i^a \delta r_i=0$$ represents…….

(A)D' Alemberts Principle   (B)Virtual work done   (C)Lagrangian equation   (D)None of these

8 The force of constraints obeys……

(A)Newtons gravitational law (B)Einsteins relativity (C)Newtons third law of motion (D)Friction

9 Planck's law reduces to Wein's law for……..

(A)Shorter wavelength   (B)Longer Wavelength   (C)Average Wavelength   (D)None of These

10 The absorptive power of perfectly black body is ……

(A)0.5   (B)0   (C)1   (D)∞

11 The spectrum of black body radiation is ……

(A)Line   (B)Band   (C)Continuous   (D)Absorption

12 Which of the following phenomenon supports the quantum nature of light……

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

13 The Value of Planck's constant is ……

(A) $6.62\times10^{-19} Js$ (B) $6.62\times10^{-27} Js$ (C) $6.62\times10^{-24} Js$ (D) $6.62\times10^{-34} Js$

14 The energy of photon is ……

(A) $E=\frac{hc}{\lambda^2}$ (B) $E=\frac{hc}{\lambda}$ (C) $E=hc\lambda$ (D)None of these

15 The Spectral distribution of energy in the black body radiation was investigated by…..

(A)Planck's and Wiens law   (B)Stefan's Law   (C)Rayleigh jeans Law   (D)Lummer and Pringshem

16 The De Broglie's hypothesis is associated with….

(A)Wave nature of electron only (B)Wave nature of particles (C)Wave nature of radiation (D)Wave nature of all particles

17 The De Broglie wavelength is represented by……

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

18 The uncertainty principle cannot hold for the following pairs….

(A)Angular momentum and angle (B)Energy and time (C)Linear momentum and angle (D)Position and momentum

19 The De Broglie wavelength is independent of…….

(A)Mass   (B)Velocity   (C)Momentum   (D)Charge

20 The De Broglie wavelength is…….. to the momentum of particle.

(A)directly proportional   (B)inversely proportional (C)constant   (D)none of these

21 The relation between phase velocity u and group velocity vg is…….

(A) $u\theta_g=c$ (B) $v_g=c^2 u$ (C) $u.v_g=c^2$ (D) $u=c^2 v_g$

22 Davisson and Germer experiment is related to…………..

(A)Interference   (B)Polarization   (C)Diffraction   (D)All of these

23 The concept of duality is firstly proposed by ……..

(A)De Broglie   (B)Einstein   (C)Taylor   (D)G.P.Thomson

24 The wave function must be ……..

046AF7125FCA0AA2D11BD81AB861A25F

(A)single valued   (B)finite   (C)continuous   (D)all of these

25 The quantity $|\Psi|^2$ represents…….

(A)charge density   (B)probability density   (C)energy density   (D)wave density

26 The energies of a particle in a box are……….

(A)0   (B)1   (C)∞   (D)None of these

27 A rule by means of which a given function can be change into another function is called

(A)Function   (B)Operator   (C)Eigen values   (D)None of these

28 Operator the time dependent Schrodinger equation is……

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

29 Probability density is

(A) $P = |\Psi|^2$ (B) $P = \Psi$ (C) $P = \Psi^2$ (D)None of these

30 For a free particle the potential energy is………..

(A)-1   (B)0   (C)1   (D)∞