DU PhD in Physics

Topic:- DU_J19_PHD_PHY

1) Which of the following attributes are applicable to the mediators of the four fundamental interactions:
I. Any integer spin
II. Nonzero, but integer spin
III. zero mass
IV. zero charge

[Question ID = 13178]

1. I and III [Option ID = 22710]
2. I alone [Option ID = 22712]
3. II alone [Option ID = 22709]
4. II and IV [Option ID = 22711]

Correct Answer :-
- II alone [Option ID = 22709]

2) In a Hydrogen atom (Bohr radius a), consider the proton to be a uniformly charged thin spherical shell of radius $R \ll a$. What is the lowest order change in the binding energy (as compared to the case of a point-particle proton)?

[Question ID = 13154]

1. $\frac{3e^2R^3}{4a^4}$ [Option ID = 22616]
2. $\frac{e^2}{2R}$ [Option ID = 22614]
3. $\frac{2e^2R}{a^2}$ [Option ID = 22613]
4. $\frac{2e^2R^2}{3a^3}$ [Option ID = 22615]

Correct Answer :-
- $\frac{2e^2R^2}{3a^3}$ [Option ID = 22615]

3) Three electrons enter a GM tube. The energies of electrons are (1) 100 keV, (2) 200 keV and (3) 500 keV. All of them are absorbed in the GM tube. What is the correct order of the pulse height of the signals thus created?

[Question ID = 13182]

1. 1=2=3 [Option ID = 22727]
2. 1=2<3 [Option ID = 22728]
3. 1>2>3 [Option ID = 22725]
4. 1<2>3 [Option ID = 22726]

Correct Answer :-
- 1=2=3 [Option ID = 22727]

4) In a bi-stable multivibrator, commutating capacitors are used to: [Question ID = 13187]

1. increase the base storage charge [Option ID = 22748]
2. change the frequency of the output [Option ID = 22747]
3. increase the speed of response [Option ID = 22745]
4. provide a.c. coupling [Option ID = 22746]

Correct Answer :-
- increase the speed of response [Option ID = 22745]

5) **Consider a line of *2n* ions with alternate charges $\pm q$. Nearest neighbours feel a repulsive potential b/r^n apart from the Coulomb attraction. If *R* be the equilibrium separation, the equilibrium energy is (here, *a* is the Maelung constant) [Question ID = 13166]**

1. $2na(b/R-q^2/R)$ [Option ID = 22663]
2. naq^2/R [Option ID = 22661]
3. $(1-n)aq^2/R$ [Option ID = 22664]
4. $na(b/R-q^2/R)$ [Option ID = 22662]

Correct Answer :-

- $(1-n)aq^2/R$ [Option ID = 22664]

---

6) **The Lyman-α spectral line for Hydrogen has a wavelength of 122 nm. When the light coming from opposite ends of the Sun's equator is examined, the spectral lines show a difference of 2×10^{12} m in their wavelengths. What is the approximate rotational speed of a Hydrogen atom at the equator? [Question ID = 13170]**

1. 4900 m/s [Option ID = 22678]
2. 6500 m/s [Option ID = 22677]
3. 1200 m/s [Option ID = 22680]
4. 2500 m/s [Option ID = 22679]

Correct Answer :-

- 2500 m/s [Option ID = 22679]

---

7) **At the present time, the temperature of the universe (i.e., the microwave radiation background) is about 3K. When the temperature was 12K, typical objects in the universe, such as galaxies, were [Question ID = 13177]**

1. separated by about the same distances as they are today [Option ID = 22707]
2. two times as distant as they are today [Option ID = 22708]
3. one-quarter as distant as they are today [Option ID = 22705]
4. one-half as distant as they are today [Option ID = 22706]

Correct Answer :-

- one-quarter as distant as they are today [Option ID = 22705]

---

8) **A binary alloy consists of N_A atoms of type *A* and N_B atoms of type *B* where $N_{A,B} \gg 1$. If $N_A/N_B \approx 1+x$ *where* $x \ll 1$*, the entropy of mixing is* [Question ID = 13167]**

1. $Nk_B[\ln 2 - 2x]$ [Option ID = 22666]
2. $Nk_B[\ln 2 + x]$ [Option ID = 22668]
3. $Nk_B[\ln 2 - x^2]$ [Option ID = 22665]
4. $Nk_B[\ln 2 + 2x^2]$ [Option ID = 22667]

Correct Answer :-

- $Nk_B[\ln 2 - x^2]$ [Option ID = 22665]

---

9) **Consider the statement: "Given a group, if g$\in$ *G*, then there exists an integer *n* such that g^n is the identity element." For this to hold, which of the following must be true?**

[Question ID = 13169]

1. *G* is finite [Option ID = 22675]
2. *G* is any group and n is positive. [Option ID = 22676]
3. *G* is infinite. [Option ID = 22673]
4. *G* has an even number of elements. [Option ID = 22674]

Correct Answer :-

- *G* is infinite. [Option ID = 22673]

---

10) **Consider two positive charges *q* and 2*q* at positions $r = 0$ and $r = R$ respectively, in free space. Another charge *Q* is placed at = r_0, where $0 < r_0 < R$. The system of the three charges**

[Question ID = 13173]

1. will never be in equilibrium in 3 dimensions [Option ID = 22692]
2. will be in equilibrium when $Q=(3\sqrt{3}-6)q$ [Option ID = 22691]

3. will be in equilibrium when $Q=(2\sqrt{3}-4)q$ [Option ID = 22689]
4. will be in equilibrium when $Q=(4\sqrt{2}-6)q$ [Option ID = 22690]

Correct Answer :-
- will be in equilibrium when $Q=(4\sqrt{2}-6)q$ [Option ID = 22690]

11) There are ten modules in a detector. Of these, eight are working properly and two are defective. Modules which are working properly, give readings each of which, independently, has a probability of 0.05 of being wrong. For the defective modules, this probability is 0.2. A module is chosen at random and ten readings recorded by it are examined. What is the probability that the module chosen is defective given that, of the ten cases examined, two are imperfect and eight are perfect? [Question ID = 13184]

1. 0.8 [Option ID = 22735]
2. 0.05 [Option ID = 22734]
3. 0.2 [Option ID = 22733]
4. 0.9 [Option ID = 22736]

Correct Answer :-
- 0.2 [Option ID = 22733]

12) A crystal contains a paramagnetic impurity whose energy levels, in the presence of a magnetic field, are $\pm E$. The impurity's contribution to the specific heat is [Question ID = 13150]

1. $\frac{E}{T} tanh^2\left(\frac{E}{k_B T}\right)$ [Option ID = 22599]
2. $\frac{E^2}{k_B T^2} \exp\left(\frac{-E}{k_B T}\right)$ [Option ID = 22600]
3. $\frac{E^2}{k_B T^2} sech^2\left(\frac{E}{k_B T}\right)$ [Option ID = 22598]
4. $\frac{E^2}{k_B T^2}$ [Option ID = 22597]

Correct Answer :-
- $\frac{E^2}{k_B T^2} sech^2\left(\frac{E}{k_B T}\right)$ [Option ID = 22598]

13) A pion of energy E decays into two photons. The opening angle θ between the photons in the limits of *(i)* $E \approx m_\pi$ and *(ii)* $E \gg m_\pi$ are given by [Question ID = 13174]

1. 0, π [Option ID = 22696]
2. π, π/2 [Option ID = 22695]
3. π/2, 0 [Option ID = 22693]
4. π, 0 [Option ID = 22694]

Correct Answer :-
- π, 0 [Option ID = 22694]

14) The Hamiltonian for a particle in one dimension is given by

$$H(x,p) = \frac{p^2}{2m} + \lambda p x + \frac{\lambda}{2} x^2$$

Where m, λ are constants. The corresponding Lagrangian is

[Question ID = 13142]

1. $L = \frac{m}{2}(\dot{x} - \lambda x)^2 - \lambda m x \dot{x} - \frac{\lambda}{2} x^2$ [Option ID = 22568]
2. $L = \frac{m}{2}\dot{x}^2 - \frac{\lambda}{2} x^2$ [Option ID = 22565]
3. $L = \frac{m}{2}\dot{x}^2 - \lambda m x \dot{x} - \frac{\lambda}{2} x^2$ [Option ID = 22567]
4. $L = \frac{m}{2}(\dot{x} - \lambda x)^2 - \frac{\lambda}{2} x^2$ [Option ID = 22566]

Correct Answer :-

- $L = \frac{m}{2}(\dot{x} - \lambda x)^2 - \frac{\lambda}{2}x^2$ [Option ID = 22566]

---

15) If $\vec{\nabla} \times \vec{F}(\vec{r}) \neq 0$ but $\vec{\nabla} \times (g(\vec{r})F(\vec{r})) = 0$ then,

[Question ID = 13139]

1. $\vec{\nabla} g(\vec{r}) \cdot (\nabla \times \vec{F}(\vec{r})) = 0$ [Option ID = 22556]
2. $\vec{\nabla} \cdot \vec{F}(\vec{r})) = 0$ [Option ID = 22555]
3. $\vec{\nabla} \times (\vec{\nabla} \times \vec{F}(\vec{r})) = 0$ [Option ID = 22554]
4. $\vec{F}(\vec{r}) \cdot (\vec{\nabla} \times \vec{F}(\vec{r})) = 0$ [Option ID = 22553]

Correct Answer :-

- $\vec{F}(\vec{r}) \cdot (\vec{\nabla} \times \vec{F}(\vec{r})) = 0$ [Option ID = 22553]

---

16) A particle having mass m is initially in the ground state of the potential $U(x)$. At time $t = 0$ the barrier in the potential $U(x)$ is suddenly removed so that potential for $t > 0$ is given by $V(x)$

$$U(x) = \frac{m\omega^2}{2}x^2 \quad \text{for} \quad 0 < x < \infty \qquad\qquad V(x) = \frac{m\omega^2}{2}x^2 \quad \text{for} \quad -\infty < x < \infty$$
$$\quad = 0 \qquad \text{for} \quad x \leq 0$$

Suppose that the particle is initially in the ground state $\phi_0(x)$for < 0 , the probability that the particle is in the new ground state $\psi_0(x) = \frac{\left(\frac{m\omega}{\pi\hbar}\right)^1}{4} e^{\frac{-m\omega x^2}{2\hbar}}$ for $t > 0$ is

[Question ID = 13161]

1. $\frac{1}{\pi}$ [Option ID = 22644]
2. $\frac{1}{\pi}\sin(\omega t)$ [Option ID = 22643]
3. 0 [Option ID = 22642]
4. $\sin(\omega t)$ [Option ID = 22641]

Correct Answer :-

- $\frac{1}{\pi}$ [Option ID = 22644]

---

17) For Boolean variables, simplifying

$$\overline{\bar{a} + d} \cdot \overline{b + \bar{c}} \cdot \overline{\bar{c} + d}$$

yields

[Question ID = 13165]

1. $a \cdot \bar{b} + c \cdot \bar{d}$ [Option ID = 22657]
2. $a \cdot \bar{b} \cdot c \cdot \bar{d}$ [Option ID = 22660]

3. $a \cdot \bar{c} \cdot b \cdot \bar{d}$ [Option ID = 22659]
4. $a \cdot b \cdot c \cdot \bar{d}$ [Option ID = 22658]

Correct Answer :-

- $a \cdot \bar{b} \cdot c \cdot \bar{d}$ [Option ID = 22660]

---

18) A system is composed of two particles moving in a one-dimensional segment of length L. The Hamiltonian is given by $= c(|p_1| + |p_2|)$, where c is a constant. The volume of the phase space enclosed by a surface of given energy E is

[Question ID = 13149]

1. E^2L^2 / c^2 [Option ID = 22594]
2. $E^2 c^2 / (2L^2)$ [Option ID = 22596]
3. $4E^2L^2 / c^2$ [Option ID = 22595]
4. $2E^2L^2 / c^2$ [Option ID = 22593]

Correct Answer :-

- $2E^2L^2 / c^2$ [Option ID = 22593]

---

19)

In a Lorentz frame , the electric and magnetic field vectors are given by $\vec{E} = \hat{x} + \hat{z}$ and $\vec{B} = 2\hat{x} + \hat{y}$ respectively. If in another Lorentz frame S' , the transformed electric and magnetic field vectors $\vec{E}'$ and $\vec{B}'$ are parallel to each other, then their magnitudes would be (in Gaussian units)

[Question ID = 13172]

1. $|\vec{E}'|=2$ and $|\vec{B}'|=1$. [Option ID = 22685]
2. $|\vec{E}'|=\sqrt{5}$ and $|\vec{B}'|=\sqrt{2}$. [Option ID = 22688]
3. $|\vec{E}'|=1$ and $|\vec{B}'|=2$. [Option ID = 22687]
4. $|\vec{E}'|=\sqrt{2}$ and $|\vec{B}'|=\sqrt{5}$. [Option ID = 22686]

Correct Answer :-

- $|\vec{E}'|=1$ and $|\vec{B}'|=2$. [Option ID = 22687]

---

20) Consider mirror nuclei ${}^{26}_{12}Mg$ and ${}^{26}_{14}Si$, if the first excited 2^+ state in ${}^{26}_{12}Mg$ is at approximately E = 1.8 MeV with respect to the ground state, what is the energy of the first excited 2^+ state in ${}^{26}_{14}Si$

[Question ID = 13181]

1. ~ 2.0 MeV [Option ID = 22723]
2. ~ 1.8 MeV [Option ID = 22721]
3. the information is incomplete [Option ID = 22724]
4. ~ 3.6 MeV [Option ID = 22722]

Correct Answer :-

- ~ 1.8 MeV [Option ID = 22721]

---

21)

Consider a gas of identical but distinguishable quantum particles of mass m each and subjected to the three-dimensional potential

$$V(\vec{r}) = \frac{1}{2}m\omega^2 r^2$$

where ω is a constant. The gas is in thermal equilibrium. What must the temperature be so that the number of particles in the first excited state is identical to that in the second excited state?

[Question ID = 13147]

1. $T = \infty$ [Option ID = 22587]
2. $T = \frac{\hbar\omega}{k_b \ln 2}$ [Option ID = 22586]
3. $T = 0$ [Option ID = 22585]
4. $T = \frac{2\hbar\omega}{k_b \ln 2}$ [Option ID = 22588]

Correct Answer :-

- $T = \frac{\hbar\omega}{k_b \ln 2}$ [Option ID = 22586]

22) Consider a particle of mass m and charge q moving in the magnetic field of a static hypothetical magnetic monopole. The field due to the magnetic monopole is given by $\vec{B} = g\hat{r} / r^2$ (where g is a constant). If the quantity $\vec{J} = \vec{L} + \vec{f}$ is a constant of motion ($\vec{L}$ being the usual angular momentum of the particle) then $\vec{f}$ equals

[Question ID = 13176]

1. $2qg\vec{r}$ [Option ID = 22703]
2. $-qg\hat{r}$ [Option ID = 22704]
3. $-qg\vec{r}$ [Option ID = 22701]
4. $2qg\hat{r}$ [Option ID = 22702]

Correct Answer :-

- $-qg\hat{r}$ [Option ID = 22704]

23) The Hamiltonian for a spinless particle having orbital angular momentum $l = 2$ is given by

$$H = \frac{3\epsilon}{2\hbar}\vec{L}_z - \frac{\epsilon}{\hbar^2}(\vec{L}_x^2 + \vec{L}_y^2); (\epsilon > 0)$$

The energy of the first excited state of the particle is

[Question ID = 13159]

1. -6ϵ [Option ID = 22633]
2. -3.5ϵ [Option ID = 22635]
3. -6.5ϵ [Option ID = 22634]
4. -5ϵ [Option ID = 22636]

Correct Answer :-

- -6ϵ [Option ID = 22633]

24) The solution to the differential equation,

$$(1+x^2)\frac{df}{dx}+xf(x)=0$$

is given by, A being an arbitrary constant,

[Question ID = 13138]

1. $\cos(A(x^2+1))$. [Option ID = 22551]
2. $A(x^2+1)^{-1/2}$ [Option ID = 22552]
3. $\ln(A(x^2+1))$. [Option ID = 22549]
4. $\ln(A(x^2+1)^{-1/2})$. [Option ID = 22550]

Correct Answer :-

- $A(x^2+1)^{-1/2}$ [Option ID = 22552]

---

25) A star is pulsating isotropically. Its gravitational force on any body, at distances much larger than its own mean radius, is given by

$$\vec{F}(\vec{r})=\left(\frac{-k}{r^3}+\frac{a}{r^4}\right)\vec{r}$$

where k and a are positive constants. Which of the following is true about the motion of the body?

[Question ID = 13143]

1. Any bounded motion is still in an elliptical path, but the parameters of the ellipse are shifted from those in the Newtonian case. [Option ID = 22571]
2. Any bounded motion is described by a pulsating ellipse. [Option ID = 22570]
3. Any bounded motion is described by a precessing ellipse. [Option ID = 22569]
4. No bounded motion exists at all. [Option ID = 22572]

Correct Answer :-

- Any bounded motion is described by a precessing ellipse. [Option ID = 22569]

---

26)

Two identical non-relativistic spinless bosons of mass m are confined to one dimension. Each particle moves under the influence of the potential $V(x)=\frac{1}{2}kx^2$, $(k>0)$. In addition there is an attractive potential between the particles given by $W(x_1,x_2)=-\lambda k x_1 x_2$. The exact energy eigenvalues for the two particle system are $E(r,s)=\hbar\omega\left[\sqrt{1-\lambda}\left(r+\frac{1}{2}\right)+\sqrt{1+\lambda}\left(s+\frac{1}{2}\right)\right]$ with $\omega=\sqrt{\frac{k}{m}}$. Then

[Question ID = 13164]

1. Both r and s must be odd integers. [Option ID = 22656]
2. Both r and s can take all integer values. [Option ID = 22654]
3. r can take any integer value but s must be an even number. [Option ID = 22655]
4. s can take any integer value but r must be an even number. [Option ID = 22653]

Correct Answer :-

- r can take any integer value but s must be an even number. [Option ID = 22655]

---

27)

A particle of mass m moves in a one dimensional potential given by $V(x) = \frac{1}{2}m\omega^2 x^2$.
It is given that the particle is in a state such that $\langle\psi|\hat{\Pi}|\psi\rangle = 0$, where $\hat{\Pi}$ is a parity operator. The lowest possible expectation value of energy for such a state is

[Question ID = 13157]

1. $\frac{1}{2}\hbar\omega$ [Option ID = 22626]
2. $\hbar\omega$ [Option ID = 22628]
3. $2\hbar\omega$ [Option ID = 22625]
4. $\frac{3}{2}\hbar\omega$ [Option ID = 22627]

Correct Answer :-

- $\hbar\omega$ [Option ID = 22628]

28)

A solid contains N spin-half magnetic atoms. At sufficiently high temperatures, the atoms are randomly oriented, while at sufficiently low temperatures, they are perfectly aligned. The heat capacity is given by

$$C(T) = \begin{cases} C_0\left(\frac{T}{T_0} - 1\right) & T_0 \leq T \leq 3T_0 \\ 0 & \text{otherwise} \end{cases}$$

where C_0 and T_0 are constants. Determine the maximum value of C_0 .

[Question ID = 13146]

1. $\frac{2Nk_B\ln 2}{2+\ln 3}$ [Option ID = 22583]
2. $\frac{Nk_B\ln 2}{2-\ln 3}$ [Option ID = 22584]
3. $\frac{Nk_B\ln 3}{2}$ [Option ID = 22582]
4. $\frac{Nk_B\ln 2}{\ln 3}$ [Option ID = 22581]

Correct Answer :-

- $\frac{Nk_B\ln 2}{2-\ln 3}$ [Option ID = 22584]

29)
[Question ID = 13144]

1. [Option ID = 22574]
2. [Option ID = 22576]
3. [Option ID = 22575]
4. [Option ID = 22573]

Correct Answer :-

- [Option ID = 22576]

30)
[Question ID = 13163]

1. [Option ID = 22652]
2. [Option ID = 22649]
3. [Option ID = 22650]
4. [Option ID = 22651]

Correct Answer :-

- [Option ID = 22651]

31)
[Question ID = 13155]

1. [Option ID = 22617]
2. [Option ID = 22618]
3. [Option ID = 22619]
4. [Option ID = 22620]

Correct Answer :-

- [Option ID = 22618]

32)
[Question ID = 13140]

1. [Option ID = 22559]
2. [Option ID = 22558]
3. [Option ID = 22557]
4. [Option ID = 22560]

Correct Answer :-

- [Option ID = 22558]

33)
[Question ID = 13145]

1. [Option ID = 22578]
2. [Option ID = 22579]
3. [Option ID = 22577]
4. [Option ID = 22580]

Correct Answer :-

34)
[Question ID = 13148]

1. [Option ID = 22592]
2. [Option ID = 22590]
3. [Option ID = 22589]
4. [Option ID = 22591]

Correct Answer :-

- [Option ID = 22589]

35)
[Question ID = 13141]

1. [Option ID = 22561]
2. [Option ID = 22562]
3. [Option ID = 22563]
4. [Option ID = 22564]

Correct Answer :-

- [Option ID = 22564]

36)
[Question ID = 13171]

1. [Option ID = 22683]
2. [Option ID = 22684]
3. [Option ID = 22681]
4. [Option ID = 22682]

Correct Answer :-

- [Option ID = 22682]

---

37)
[Question ID = 13179]

1. strong interaction [Option ID = 22716]
2. weak interaction [Option ID = 22714]
3. gravitational interaction [Option ID = 22713]
4. electromagnetic interaction [Option ID = 22715]

Correct Answer :-

- weak interaction [Option ID = 22714]

---

38)
[Question ID = 13162]

1. [Option ID = 22648]
2. [Option ID = 22645]
3. [Option ID = 22647]
4. [Option ID = 22646]

Correct Answer :-

- [Option ID = 22648]

---

39)
[Question ID = 13160]

1. 1/4 [Option ID = 22639]
2. 1/4p [Option ID = 22640]
3. 1/2 [Option ID = 22637]
4. 1/2p [Option ID = 22638]

Correct Answer :-

- 1/2 [Option ID = 22637]

---

40)
[Question ID = 13158]

1. [Option ID = 22630]
2. [Option ID = 22631]
3. [Option ID = 22629]
4. [Option ID = 22632]

Correct Answer :-

- [Option ID = 22632]

---

41)
[Question ID = 13168]

1. [Option ID = 22671]
2. [Option ID = 22672]
3. [Option ID = 22669]
4. [Option ID = 22670]

Correct Answer :-

- [Option ID = 22670]

---

42)
[Question ID = 13156]

1. [Option ID = 22623]
2. [Option ID = 22622]
3. [Option ID = 22624]
4. [Option ID = 22621]

Correct Answer :-

- [Option ID = 22624]

---

43) [Question ID = 13151]

1. 8K [Option ID = 22602]
2. 6K [Option ID = 22604]
3. 2K [Option ID = 22601]
4. 4K [Option ID = 22603]

Correct Answer :-

- 6K [Option ID = 22604]

44) A classical charged particle moves in a circle at constant speed. Which of the following is true? [Question ID = 13186]

1. It emits both electric dipole and magnetic dipole radiation. [Option ID = 22744]
2. It emits electric dipole radiation. [Option ID = 22741]
3. It emits electric dipole and electric quadrupole radiation. [Option ID = 22742]
4. It emits magnetic dipole radiation. [Option ID = 22743]

Correct Answer :-

- It emits electric dipole radiation. [Option ID = 22741]

45) Consider an atom in a flame emitting in optical wavelengths. What would the typical Doppler broadening of a line be? [Question ID = 13153]

1. 10^9Hz [Option ID = 22609]
2. 10^3Hz [Option ID = 22612]
3. 10^6Hz [Option ID = 22611]
4. 10^{12}Hz [Option ID = 22610]

Correct Answer :-

- 10^9Hz [Option ID = 22609]

46) A proton of momentum 1.0 GeV/ c is passing through a gas. What is the minimum index of refraction of the gas so that the proton may emit Čerenkov radiation? [Question ID = 13175]

1. 1.53 [Option ID = 22697]
2. 1.80 [Option ID = 22700]
3. 1.37 [Option ID = 22699]
4. 1.21 [Option ID = 22698]

Correct Answer :-

- 1.37 [Option ID = 22699]

47) In a certain place, it rains on one third of the days. The localnewspaper (early city edition) attempts to predict whether or not itwill rain during the day. Three quarters of rainy days and threefifths of dry days are correctly predicted. Given that today's paper predicts rain, what is theprobability that it will actually do so? [Question ID = 13183]

1. 0.61 [Option ID = 22730]
2. 0.73 [Option ID = 22731]
3. 0.48 [Option ID = 22732]
4. 0.51 [Option ID = 22729]

Correct Answer :-

- 0.48 [Option ID = 22732]

48) A JK flip flop has t_{pd}= 3.5 ns. The largest modulus of a ripple counter using these flip flops and operating at 30 MHz is [Question ID = 13185]

1. 1024 [Option ID = 22740]
2. 512 [Option ID = 22738]
3. 128 [Option ID = 22739]
4. 64 [Option ID = 22737]

Correct Answer :-

- 512 [Option ID = 22738]

49) Which of the following decays is allowed: [Question ID = 13180]

1. [Option ID = 22720]
2. [Option ID = 22718]
3. [Option ID = 22719]
4. [Option ID = 22717]

Correct Answer :-

- [Option ID = 22719]

50) The interatomic potential between H-atoms has a range of approximately 4 Å. If a gas of H-atoms is in thermal equilibrium, what is the temperature T below which atom–atom scattering is overwhelmingly dominated by the s-wave amplitude?

[Question ID = 13152]

1. 1°K [Option ID = 22606]
2. 50°K [Option ID = 22608]
3. 20°K [Option ID = 22607]
4. 10°K [Option ID = 22605]

Correct Answer :-

- 1°K [Option ID = 22606]