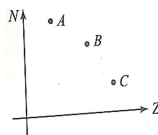


NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI
CLASS 12 (PHYSICS) DPP (Academy) 02/09/2024

1. The probability of survival of a radioactive nucleus for one mean life is ?
2. Two deuterons are moving towards each other with equal speeds. What should be their initial kinetic energies so that the distance of closest approach between them is 2 fm?
3. Only 1/8 th of total initial number of active radioactive nuclei of a sample is left after 6 days. Then, in 10 days fraction that decays is ?
4. The rest mass of the deuteron, 2_1H , is equivalent to an energy of 1876 MeV, the rest mass of a proton is equivalent to 939 MeV and that of a neutron to 940 MeV. A deuteron may disintegrate to a proton and a neutron if it
5. A stationary ${}^{238}_{92}U$ nucleus decays by α emission generating a total kinetic energy T.
$${}^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^4_2\alpha$$

What is the kinetic energy of the α particle?
6. Equal masses of two samples A and B of charcoal are burnt and the activity of resulting carbon-di-oxide from two samples is measured. The gas from sample A gives 10^4 counts per month and that from sample B gives 2.5×10^3 counts per month. The age difference of two samples is (Half life of C^{14} is 5730 years)
7. A radioactive sample decays by two different processes. Half life for the first process is t_1 and for the second process is t_2 The effective half-life is
8. Consider $X \xrightarrow{-\alpha} Y \xrightarrow{-\alpha} Z$, where half-lives of X and Y are Z year and one month. The ratio of atoms of x and y when transient equilibrium $[T_{1/2}(X) > T_{1/2}(Y)]$ has been established is
9. The half life of that radioactive substance, which reduces to 1/64 of its initial value in 15 hours, will be ?
10. Consider the plot of N (neutron number) versus Z (proton number) for the different nuclei. Let three nuclides A, B and C are at the positions as shown in the figure. The order of their stability may be



11. The decay constants of a radioactive substance for α and β emission are λ_α and λ_β respectively. If the substance emits α and β simultaneously, the

- average half life of the material will be ?
12. In order to fuse two nuclei, they must be brought at a separation of about 2 fm or less. Let two deuterium nuclei may be brought to fuse together by colliding them with equal and opposite velocities.
Minimum speed required for above process must be around ?
 13. Two radioactive sources A and B initially contain equal number of radioactive atoms. Source A has a half-life of 1 hour and source B has a half-life of 2 hours. At the end of 2 hours, the ratio of the rate of disintegration of A to that of B is
 14. A radioactive substance X decays into another radioactive substance Y. Initially only X was present λ_x and λ_y are the disintegration constants of X and Y. N_x and N_y are the number of nuclei of X and Y at any time t. Number of nuclei N_y will be maximum when
 15. In fission of a ${}^{235}_{92}U$ nucleus 200 MeV energy is released. To maintain a power output of 5W, fission rate of ${}^{235}U$ must be maintained at
 16. A radon nucleus ${}^{222}_{86}Rn$ of mass 3.6×10^{-25} kg undergoes α -decay. α -particle has mass 6.7×10^{-27} kg and energy 8.8×10^{-13} J the velocity of α -particle is
 17. The binding energy per nucleon of C-12 is 7.68 MeV and of C-13 is 7.48 MeV. The energy (in MeV) required to remove the extra neutron from C-13 is very nearly equal to
 18. Let your town's daily requirement is of 950 MW power, which is fulfilled by a 38% efficient nuclear power plant. Mass of fuel ${}^{238}_{92}U$ required to meet demand for 1 yr will be (Assume that a total of 200 MeV per fission is obtained)
 19. A radioactive nucleus is being produced at a constant rate α per second. Its decay constant is λ . If N_0 are the number of nuclei at time $t = 0$ then maximum number of nuclei possible are
 20. Half-life of a radioactive substance A is two times the half-life of another radioactive substance B. Initially the number of nuclei of A and B are N_A and N_B respectively. After three half-lives of A number of nuclei of both are equal. Then the ratio N_A / N_B is

NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI
CLASS 12 (MATH'S) DPP (Academy) 02/09/2024

19. The area bounded by $y = \sec^{-1} x$; $y = \operatorname{cosec}^{-1} x$ and line $x - 1 = 0$ is
20. The area bounded by the curve $y = x e^{-x}$; $xy = 0$ and $x = c$ where c is the x-coordinate of the curve's inflection point, is

1. If $y=f(x)$ makes positive intercepts of 2 and 0 unit on x and y axes and encloses an area of $\frac{3}{4}$ sq. unit with the axes, then $\int_0^2 x f'(x) dx$ is equal to
2. The area bounded by the curves $y = \log_e x, y = \log_e |x|, y = |\log_e x|$, and $y = |\log_e |x||$ is,
3. The area of the region bounded by the curves $y = |x-1|$ and $y = 3 - |x|$ is
4. If $I_1 = \int_0^1 2x^2 dx, I_2 = \int_0^1 2x^3 dx, I_3 = \int_1^2 2x^2 dx$, and $I_4 = \int_1^2 2x^2 dx$, then
5. The solution for x to the equation
- $$\int_{\sqrt{2}}^x \frac{dt}{t\sqrt{t^2-1}} = \frac{\pi}{2}$$
- is
6. The area bounded by the curves $y = \cos x$ and $y = \sin x$ between the ordinates $x = 0$ and $x = 3\pi/2$ is
7. The area of the region enclosed by the curves $y = x, x = e, y = \frac{1}{x}$ and the positive x-axis is
8. The area bounded by the curves $y = f(x)$ the x-axis, and the ordinates $x = 1$ and $x = b$ ($b > 1$) is $(b-1) \sin(3b+4)$. Then $f(x)$ is
9. The area bounded by the curves $y = |x| - 1$ and $y = -|x| + 1$ is
10. The area enclosed between the curves $y = ax^2$ and $x = ay^2$ (where $a > 0$) is 1 sq. unit, then the value of a is
11. The area of figure bounded by $y = e^x, y = e^{-x}$ and the straight line $x = 1$ is
12. If the area above the x-axis, bounded by the curves $y = 2^{kx}$ and $x = 0$ and $x = 2$ is $\frac{3}{\ln 2}$ then the value of k is
13. Area inside the parabola $y^2 = 4ax$ between the lines $x = a$ and $x = 4a$ is equal to
14. The area (in square units) of the region bounded by $x = -1, x = 2, y = x^2 + 1$ and $y = 2x - 2$ is
15. The area of the region described by $\{(x, y) / x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - 1\}$ is
16. The area bounded by parabola $y^2 = x$ straight line $y = 4$ and y-axis is
17. The area of the region bounded by the parabola $y = x^2 + 1$ and the straight line $x + y = 3$ is given by
18. The area between two arms of the $|y| = x^3$ from $x = 0$ to $x = 2$ is

NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI
CLASS 12 (CHEMISTRY) DPP (Academy) 02/09/2024

1. Why is sulphuric acid not used during the reaction of alcohols with KI ?
2. Among the isomeric alkanes of molecular formula C_5H_{12} , identify the one that on photochemical chlorination yields :
3. Which one of the following has the highest dipole moment ?
4. A hydrocarbon C_5H_{10} does not react with chlorine in dark but gives a single monochloro compound, C_5H_9Cl in bright sunlight. Identify the hydrocarbon.
5. Write the isomers of the compound having formula C_4H_9Br
6. What are amine nucleophiles ? Explain with an example.
7. How will you bring about the following conversions ?
 - a) Ethanol to but-1-ene,
 - b) Ethane to bromoethane,
8. Explain why the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride ?
9. Give the uses of Freon-12, DDT, carbon tetrachloride and iodoform.
10. Explain the mechanism of the following reaction :
$$n\text{-BuBr} + \text{KCN} \xrightarrow{\text{EtOH}-\text{H}_2\text{O}} n\text{-BuCN}$$
11. Out of $C_6H_5CH_2Cl$ and $C_6H_5CHClC_6H_5$ Which is more easily hydrolysed by aq. KOH ?
12. p-Dichlorobenzene has higher melting point than those of o- and m-isomers. Discuss.
13. How the following conversions can be carried out ?
 - A) Propene to propan-1-ol
 - B) Ethanol to but-1-ene
14. What is the formula of Freon-12 and Freon-13 ?
15. What happens when n-butyl chloride is treated with alcoholic KOH.
16. Give reactants inorganic or organic needed to convert benzyl bromide into :
17. How will you convert benzene to monodeuterated benzene ?
18. Propene on treating with Cl_2 at 773K gives allyl chloride. Which other reagent can be used for this conversion ?
19. Haloarenes are insoluble in water but are soluble in benzene.
20. Which halogenation reaction is more exothermic and why ?

NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI
CLASS 12 (BIOLOGY) DPP (Academy) 02/09/2024

1. Why flower is a fascinating organ of angiosperms ?
2. What is essential part of flower labeled diagram of these part
3. How many layers are present in the wall of mature microsporangium give its function.
4. What is difference between microspore tetrad and pollen grains.
5. What is radius of spherical pollen grain draw a labeled diagram.
6. What is percentage of angiosperm pollen grains are shed at this 2-celled stage. Give the name of this 2 cell.
7. What is importance of pollen tablets
8. Give the short notes – pollen bank
9. Define :- (i) megasporophyll (ii) Megasporangium (iii) syncarpous (iv) Apocarpous
10. Draw a labeled diagram of megasporangium given
11. What is function of synergids
12. Give the function of filiform apparatus of synergids
13. Give the name of largest cell of female gametophyte.
14. Define pollination
15. Define the term – (i) autogamy (ii) Geitonogamy (iii) Xenogamy
16. What is leistic agent of pollination.
17. What is abiotic agent
18. What are features of wind-pollinated flower
19. What is feature of insect-pollinated flower
20. What are outbreeding devices.