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## CHEMISTRY

# BOOKS - S DINESH \& CO CHEMISTRY 

 (HINGLISH)
## NUCLEAR AND RADIO CHEMISTRY

## Multiple Choice Questions

1. What will be the total number of electrons, protons and neutrons in the product formed by the loss of one $\alpha$-particle ${ }_{92}^{238} U$ ?
A. 326
B. 333
C. 324
D. 332

## Answer: C

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2. The nuclear radius as compared to the atomic radius,
is of the order of
A. $10^{-2}$
B. $10^{-4}$
C. $10^{-6}$
D. $10^{-8}$

## Answer: B

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3. The density of a nucleus is of the order of
A. $10^{5} \mathrm{kgm}^{-3}$
B. $10^{10} \mathrm{kgm}^{-3}$
C. $10^{17} \mathrm{kgm}^{-3}$
D. $10^{25} \mathrm{kgm}^{-3}$

## Answer: C

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4. An isotone of ${ }^{76} G e$ is-
(a). $\cdot{ }_{32}^{77} G e$
(b). ${ }_{33}^{77} A s$
(c). ${ }_{34}^{77} S e$
(d). ${ }_{34}^{78} S e$
A. ${ }_{77}^{32} G e$
B. ${ }_{33}^{77} A s$
C. ${ }_{34} \mathrm{Se}$
D. ${ }_{34}^{78} S e$

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5. Neutrino can be detected during the emission of
A. $\alpha$-rays
B. $\beta$-particles
C. protons
D. X-rays

Answer: B
6. An isobar of $\cdot{ }_{20} C a^{40}$ is
A. ${ }_{18}^{49} A r$
B. ${ }_{20}^{38} C a$
C. ${ }_{20}^{42} C a$
D. ${ }_{18}^{38} A r$

Answer: A
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7. An isotope of ${ }^{231} T h$ can be converted into ${ }^{227} T h$ by
the emission of
A. one $\alpha$-particle
B. one $\beta$-particle
C. two $\alpha$ and one $\beta$ - particle
D. one $\alpha$ and two $\beta$-particle

## Answer: D

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8. Two elements $X$ and $Y$ are isotonic having atomic weight 54 and 56 respectively. If the atomic number of $X$ is 26 , then the atomic number of $Y$ will be
A. 26
B. 27
C. 28
D. 30

## Answer: C

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9. Which of the following are isodiapheres ?
A. A nuclide and its decay product after emission of an alpha-particle
B. A nuclide and its decay product after emission of
a beta-particle
C. A nuclide and its decay product after emission of
gamma-rays
D. Spherical atoms having the same diameter.

Answer: A

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10. The radiation from naturally occuring radioactive substance as seen after deflection by a magnetic field in one direction are :
A. Definitely $\alpha$-particle
B. Definitely $\beta$-rays
C. Both $\alpha$ and $\beta$-rays
D. Either $\alpha$ or $\beta$-rays

## Answer: D

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11. The instability of a nucleus is due to
A. high electron proton ratio
B. high neutron proton ratio
C. low electron proton ratio
D. low neutron electron ratio

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12. Which one of the following pairs represents isotopes?
A. ${ }_{17}^{35} \mathrm{Cl},{ }_{17}^{37} \mathrm{Cl}$
B. ${ }_{1}^{2} H,{ }_{2}^{3} \mathrm{He}$
C. ${ }_{1}^{2} H,{ }_{2}^{3} \mathrm{He}$
D. ${ }_{32}^{76} G e,{ }_{34}^{76} S e$

Answer: A
13. The first non-ratioactive light element which was shown to exhibit isotopy was
A. hydrogen
B. neon
C. helium
D. lithium

Answer: A
(D) Watch Video Solution
14. The first non-ratioactive heavy element, which was shown to exhibity isotopy was
A. bismuth
B. lead
C. germanium
D. none of these

Answer: B

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15. Nuclides having the same atomic and mass numbers
are known as
A. isomers
B. isotopes
C. isotones
D. isobars

## Answer: A

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16. Two nuclei are not identical but have the same number of nucleons. These are
A. isotones
B. isobars
C. isotopes
D. None of the above

Answer: B

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17. Which one of the following pairs represents isobars?
A. ${ }_{1}^{2} H,{ }_{2}^{3} \mathrm{He}$
B. ${ }_{1}^{3} \mathrm{H},{ }_{2}^{3} \mathrm{He}$
C. ${ }_{37}^{17} \mathrm{Cl},{ }_{37}^{17} \mathrm{Cl}$
D. ${ }_{1}^{1} H,{ }_{11}^{2} H$

Answer: B

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18. Atom with the same atomic number and different mass numbers are called a)Isobars b)Isomers
c)Isotones d)Isotopes
A. isobars
B. isomers
C. isotones
D. isotopes

Answer: D

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19. The isotoic mass of ${ }_{92}^{238} U$ is 238.125 a.m.u. Its packing fraction is
A. 5.25
B. 0.125
C. 12.5
D. 1.25

## Answer: A

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20. The two nuclides $z^{A^{m}}$ and ${ }_{z-2} B^{m-4}$ are known as
A. isotones
B. nuclear isomers
C. isomers
D. isodiapheres

## Answer: D

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21. What is the packing fraction of ${ }_{26}^{56} \mathrm{Fe}$ ?
A. $+14 \cdot 167$
B. $+73 \cdot 90$
C. $-14 \cdot 167$
D. $-73 \cdot 90$

Answer: C

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22. An isobar of ${ }_{20}^{40} \mathrm{Ca}$ is
A. ${ }_{18}^{40} \mathrm{Ar}$
B. ${ }_{20}^{38} \mathrm{Ca}$
C. ${ }_{20}^{42} \mathrm{Ca}$
D. ${ }_{19}^{39} K$
23. Atoms of different elements having the same number of neutrons but differnet atomic numbers are called
A. isotopes
B. isotones
C. isobars
D. none of these

Answer: B
24. Nuclides having the same difference in mass number and atomic number, are known as
A. isotopes
B. isobars
C. isotones
D. isomers

Answer: C

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25. When a radius atom, which is placed in the lind group loses an alpha-particle forming a new element, it should be placed in ...... the group
A. Second
B. First
C. Fourth
D. Zero group

Answer: D

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26. In the reaction, $\mathrm{Po} \xrightarrow{-\alpha} \mathrm{Pb} \xrightarrow{-\beta} \mathrm{Bi}$, if Bi belongs to group 15, to which group Po belongs?
A. 14
B. 15
C. 13
D. 16

## Answer: D

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27. ${ }_{91}^{234} \mathrm{~Pa} \rightarrow{ }_{92}^{234} U$ occurs with the emission of
A. $\alpha$-particles
B. $\beta$-particles
C. $\gamma$-rays
D. positron

## Answer: B

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28. In the following nuclear reaction
${ }_{\cdot 13} A l^{27}+{ }_{.2} H e^{4} \rightarrow{ }_{\cdot 15} P^{30}+X, X$ will be
A. Sulphur
B. Carbon
C. Phosphorus
D. Silicon

## Answer: C

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29. In the decay process:
$A \xrightarrow{-\alpha} B \xrightarrow{-\beta} C \xrightarrow{-\beta} D$ a) $A$ and $B$ are isodiaphers b)
$A$ and $C$ are isotones c) $A$ and $C$ are isotopes d) $B, C$
and $D$ are isobars
$A . A$ and $B$ are isobars
B. A and C are isobar
C. A and D are isotopes
D. B and C are isotopes

## Answer: C

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30. In a neutron induced reaction ${ }_{92}^{235} U$, the product obtained is ${ }_{37}^{95} R b$, three neutrons and an element (new nuclide). The other new nuclide is
A. ${ }_{55}^{138} \mathrm{Cs}$
B. ${ }_{56}^{140} \mathrm{Ba}$
C. ${ }_{54}^{144} \mathrm{Xe}$
D. ${ }_{38}^{90} S r$

Answer: A

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31. When ${ }_{92} U^{238}$ decauys it emits an a-particle. The new nuclide in turn emits a beta-particele to give another nuclide X . The mass number and atomic number of $X$ are. Respectively .
A. 234 and 91
B. 234 and 96
C. 232 and 88

D. 234 and 88

Answer: A

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32. If .92 $U^{235}$ assumed to decay only by emitting two $\alpha$
-and one $\beta$-particles, the possible product of decays is
a). $89 A c^{231}$
b). $89 A c^{235}$
c). $89 A c^{236}$
d). ${ }_{89} A c^{227}$
A. ${ }_{98} A C^{211}$
B. ${ }_{89} A c^{235}$
C. ${ }_{89} A c^{235}$
D. $89 A c^{227}$

## Answer: D

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33. During the transformation of ${ }_{c} X^{a}$ to ${ }_{\cdot d} Y^{b}$ the number of $\beta$-particles emitted are
a. $d+\left(\frac{a-b}{2}\right)-c$ b. $\frac{a-b}{c}$
c. $d+\left(\frac{a-b}{2}\right)+c \mathrm{~d} .2 c-d+a=b$
A. $\frac{a-b}{4}$
B. $d+\frac{a-b}{2}+c$
C. $d+\left[\frac{a-b}{2}\right]-c$
D. $2 c-d+a-b$

## Answer: C

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34. If ${ }^{235} U$ is bombarded with neutron, the atom will split into
A. $\mathrm{Sr}+\mathrm{Pb}$
B. $\mathrm{Cs}+\mathrm{Ra}$
C. $\mathrm{Kr}+\mathrm{Cd}$
D. $\mathrm{Ba}+\mathrm{Kr}$

Answer: D

## 35. In the reaction

${ }_{2}^{9} B e+X \rightarrow{ }_{5}^{10} B+\gamma, X$ is
A. proton
B. deutron
C. $\alpha$-particles
D. neutron

Answer: A
36. The reaction
${ }_{\cdot 1} D^{2}+{ }_{.1} T^{3} \rightarrow{ }_{.2} \mathrm{He}^{4}+{ }_{.0} n^{1}$
is an example of a)Nuclear fission b)Nuclear fusion
c)Artifical radioactivity d)Radioactive disintegration
A. nuclear fission
B. nuclear fusion
C. artifical radioactivity
D. radioactive disintegration

## Answer: B

37. Which of the following projectiles is the best for bombarding the nuclide? a) $\alpha$-particle b)Proton c) Deuteron d)Neutron
A. $\alpha$-particles
B. proton
C. deutron
D. neutron

Answer: D
38. Helium may be produced by the fusion of isotopes of
A. Radium
B. Uranium
C. Plutonium
D. Hydrogen

Answer: D

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39. When a stable element is rendered radioactive by artifical transmutation, the phenomenon is called
A. Ionisation
B. Nuclear fission
C. Nuclear fusion
D. Artifical radioactivity

## Answer: D

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40. The radioactive decay follows zero - order kinetics.
A. zero order
B. first order
C. second order
D. third order

Answer: A

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41. The subatomic particle more effective in bringing artifical transmutation of element is
A. ${ }_{0}^{1} n$
B. ${ }_{2}^{1} \mathrm{He}$
C. ${ }_{1}^{2} H$
D. ${ }_{-1} e$

Answer: A

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42. Bismuth is the end product of radioactive disintegration series known as
A. $4 n$
B. $4 n+1$
C. $4 n+2$
D. $4 n+3$

Answer: B

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43. The $4 n$ series starts from Th-232 and ends at
A. Ph-208
B. $\mathrm{Bi}-209$
C. Pb-206
D. Pb-207

## Answer: A

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44. In the given reaction
$\cdot_{z} X^{A} \rightarrow{ }_{\cdot z+1} Y^{A} \rightarrow{ }_{z-1} K^{A-4} \rightarrow{ }_{\cdot z-1} K^{A-4}$

Radioactive radiations are emitted in the sequence.
A. $\alpha, \beta, \gamma$
B. $\beta, \alpha, \gamma$
C. $\gamma, \alpha, \beta$
D. $\beta, \gamma, \alpha$

## Answer: B

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45. $.89 A c^{227}$ is a member of actinium series. Another member of the same series of
A. ${ }_{22} U^{235}$
B. ${ }_{90} T H^{232}$
C. ${ }_{89} A c^{225}$
D. ${ }_{15} P^{34}$

Answer: A

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46. Bismuth is the end product of radioactive disintegration series known as
A. bismuth
B. Thorium
C. Any isotope of lead
D. Any isotope of calcium

## Answer: C

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47. Actinium disintegration series starts with A and ends at $Z$. $A$ and $Z$ are
A. ${ }_{60} T h^{232}$
B. ${ }_{92} U^{235}, P b^{207}$
C. ${ }_{92} U^{238}, P b^{208}$
D. $86 A c^{227}, B i^{209}$

Answer: B
48. The easily fissionable isotope of uranium is with the number
A. 235
B. 236
C. 237
D. 238

Answer: A
49. A possible material for use in nuclear reactors is
A. carbon-14
B. Ziroconium
C. Beryllium
D. Plutonium

## Answer: D

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50. The fissile material ${ }_{94} P u^{239}$ is produced from
A. ${ }_{92}^{233} U$
B. ${ }_{92}^{235} U$
C. ${ }_{92}^{238} U$
D. Any of these

## Answer: C

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51. Which of the following is a fission reaction?
A. ${ }_{1}^{1} H+{ }_{1}^{1} H+2{ }_{0}^{1} n \rightarrow{ }_{2}^{4} H e+$ Energy
B. ${ }_{92}^{239} U+{ }_{0}^{1} n \rightarrow{ }_{56}^{141} \mathrm{Ba}+{ }_{36}^{92} \mathrm{Kr}+3{ }_{0}^{1} n$
C. ${ }_{92}^{239} U+{ }_{0}^{1} n \rightarrow{ }_{92}^{239} U+{ }_{1}^{1} \lambda$
D. ${ }_{27}^{59} \mathrm{Co}+{ }_{1}^{2} \mathrm{H} \rightarrow{ }_{27}^{60} \mathrm{Co}+{ }_{1}^{1} \mathrm{H}$

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52. The amount of U-235 present in natural uranium is
A. $1 \%$
B. $3 \%$
C. $0.7 \%$
D. $7 \%$

## Answer: C

53. In a radioactive decay, an emitted electron comes from
A. Outermost orbit of the atom
B. Inner shells of the atom
C. Nucleus of the atom
D. None of these

## Answer: C

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54. Which of the following nuclear change is incorrect?
a). ${ }_{20} C a^{40}+{ }_{\cdot 0} n^{1} \rightarrow{ }_{\cdot 19} K^{40}+{ }_{\cdot 1} H^{1}$
${ }_{\cdot 12} M g^{24}+\alpha \rightarrow{ }_{\cdot 14} S i^{27}+{ }_{.0} n^{1}$
${ }_{\cdot 48} C d^{113}+{ }_{.0} n^{1} \rightarrow{ }_{.48} C d^{112}+\cdot{ }_{-1} e^{0}$
${ }_{\cdot 20} C o^{43}+\alpha \rightarrow \cdot{ }_{21} S i^{46}+{ }_{\cdot 1} H^{1}$
A. ${ }_{20} C a^{40}+{ }_{0} n^{1} \rightarrow{ }_{19} K^{40}+{ }_{1} H^{1}$
B. ${ }_{12} M g^{24}+\alpha \rightarrow{ }_{14} S i^{27}+{ }_{0} n^{1}$
C. ${ }_{48} C d^{113}+{ }_{0} n^{1} \rightarrow{ }_{48} C d^{112}+{ }_{-1} e^{0}$
D. ${ }_{20} C o^{43}+\alpha \rightarrow{ }_{21} S i^{46}+{ }_{1} H^{1}$

## Answer: C

55. Which one of the following particles is used to bombard ${ }_{13} A l^{27}$ to give ${ }_{15} P^{30}$ and a neutron?
A. ${ }_{1} H^{2}$
B. $\gamma$
C. $\alpha$
D. $\beta$

## Answer: C

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56. Which is the missing particle in the following nuclear reaction ?
${ }_{3} L i^{7}+{ }_{1} H^{2} \rightarrow{ }_{3} L i^{8}+?$
A. Proton
B. Deutron
C. positron
D. alpha- particle

Answer: A

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57. Which of the following nuclear reaction occurs in nature for the formation of tritium? a)
${ }_{\cdot 3} L i^{6}+{ }_{.0} n^{1} \rightarrow{ }_{.2} H e^{4}+{ }_{.1} H^{3}$
${ }_{.5} B^{10}+{ }_{.0} n^{1} \rightarrow 2 .{ }_{2} H e^{4}+{ }_{.1} H^{3}$
${ }_{.7} N^{14}+{ }_{.0} n^{1} \rightarrow{ }_{.6} C^{12}+{ }_{.1} H^{3}$
${ }_{.4} B e^{9}+{ }_{.1} D^{2} \rightarrow 2 .{ }_{2} H e^{4}+{ }_{.1} H^{3}$
A. $3_{3} L i^{6}+{ }_{0} n^{1} \rightarrow{ }_{2} H e^{4}+{ }_{1} H^{3}$
B. ${ }_{5} B^{10}+{ }_{0} n^{1} \rightarrow 2{ }_{2} H e^{4}+{ }_{1} H^{3}$
C. $5 B^{11}+{ }_{2} H e^{4} \rightarrow{ }_{6} C^{12}+{ }_{1} H^{3}$
D. ${ }_{4} B e^{9}+{ }_{1} D^{2} \rightarrow 2{ }_{2} H e^{4}+{ }_{1} H^{3}$

Answer: A
58. On bombarding ${ }_{7} N^{14}$ with $\alpha$-particles, the nuclei of
the product formed after the release of a proton will
be
A. ${ }_{9} F^{17}$
B. ${ }_{8} O^{17}$
C. ${ }_{9} F^{18}$
D. ${ }_{8} N^{18}$

Answer: B
59. Which one of the following nuclear transformation is ( $\mathrm{n}, \mathrm{p}$ ) type?
A. ${ }_{3} L i^{7}+{ }_{1} H^{1} \rightarrow{ }_{4} B e^{7}+{ }_{0} n^{1}$
B. $3_{3} A s^{75}+{ }_{1} H^{1} \rightarrow{ }_{34} B e^{7}+{ }_{0} n^{1}$
C. ${ }_{83} B i^{209}+{ }_{1} H^{2} \rightarrow{ }_{80}{P o^{210}}^{210}{ }_{0} n^{1}$
D. ${ }_{21} S c^{45}+{ }_{0} n^{1} \rightarrow{ }_{20} C a^{45}+{ }_{1} H^{1}$

## Answer: D

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60. Which of the following transformations is not
A. ${ }_{33} A s^{75}+{ }_{2} H e^{4} \rightarrow{ }_{35} B r^{78}+{ }_{0} n^{1}$
B. ${ }_{3} L i^{7}+{ }_{2} H e^{4} \rightarrow{ }_{5} B^{10}+{ }_{0} n^{1}$
C. ${ }_{88} B i^{209}+{ }_{0} n^{1} \rightarrow{ }_{20} C a^{40}+{ }_{1} H^{1}$
D. ${ }_{21} S c^{45}+{ }_{0} n^{1} \rightarrow{ }_{20} C a^{45}+{ }_{1} H^{1}$

## Answer: C

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61. For the nuclear reaction, ${ }_{0} n^{1} \rightarrow{ }_{\cdot 1} H^{1}+$ ?, the missing nuclide is
A. ${ }_{33} A s^{75}+{ }_{2} H e^{4} \rightarrow{ }_{35} B r^{78}+{ }_{0} n^{1}$
B. ${ }_{3} L i^{7}+{ }_{2} \mathrm{He}^{4} \rightarrow{ }_{35} \mathrm{Br}^{78}+{ }_{0} n^{1}$
C. ${ }_{88} B i^{209}+{ }_{0} n^{1} \rightarrow{ }_{20}{C a^{40}}^{40} H^{1}$
D. ${ }_{21} S c^{45}+{ }_{0} n^{1} \rightarrow{ }_{20} C a^{45}+{ }_{1} H^{1}$

Answer: B

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62. The nuclide ${ }_{99}^{247}$ Es can be obtained by bombarding ${ }_{92}^{239} U$ in a reaction that emits 5 neutrons. The bombarding particle is
A. ${ }_{2}^{4} \mathrm{He}$
B. ${ }_{1}^{3} H$
C. ${ }_{7}^{13} N$
D. ${ }_{-1} e$

Answer: C

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63. Which of the following nuclear reactions is incorrect?
A. ${ }_{29}^{63} C u\left(p,{ }_{1}^{2} H\right){ }_{29}^{62} C u$
B. ${ }_{4}^{9} B e\left(\alpha,{ }_{0}^{1} n\right){ }_{6}^{12} C$
C. ${ }_{5}^{10} \mathrm{Be}\left(\alpha,{ }_{0}^{1} n\right){ }_{6}^{12} N$
D. ${ }_{227}^{59} C o\left(n,{ }_{1}^{2} H\right){ }_{25}^{56} M n$

## Answer: D

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64. For the nuclear reaction
${ }_{12}^{24} M g+d \rightarrow \alpha+$ ? The missing nuclide is
A. ${ }_{11}^{22} N a$
B. ${ }_{12}^{27} \mathrm{Mg}$
C. ${ }_{12}^{26} \mathrm{Mg}$
D. ${ }_{11}^{23} N a$

Answer: A
65. The nuclear reaction which is not accompanied with the emission of neutrons is

$$
\begin{aligned}
& \text { A. }{ }_{33}^{75} \mathrm{As}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{35}^{78} \mathrm{Br} \\
& \text { B. }{ }_{13}^{27} \mathrm{Al}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{15}^{30} p \\
& \text { C. }{ }_{95}^{241} \mathrm{Am}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{97}^{244} \mathrm{Bk} \\
& \text { D. }{ }_{6}^{12} \mathrm{C}+{ }_{1}^{1} \mathrm{H} \rightarrow{ }_{7}^{13} \mathrm{~N}
\end{aligned}
$$

## Answer: D

66. When $\cdot{ }_{17} C l^{35}$ undergoes $(n, p)$ reaction, the radioisotope formed is a) $\cdot 15 P^{32}$ b) $\cdot 16 S^{35}$ c) $\cdot{ }_{16} S^{34}$ d)
$\cdot{ }_{15} P^{34}$
A. ${ }_{15} P^{32}$
B. ${ }_{16} S^{35}$
C. ${ }_{16} S^{34}$
D. ${ }_{15} P^{34}$

Answer: B
67. The number of $\alpha$-particles emitted by
${ }_{84}^{218} \mathrm{Ra} \rightarrow{ }_{82}^{206} \mathrm{~Pb}$ is
A. 3
B. 4
C. 6
D. 2

Answer: A

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68. How many $\alpha$ and $\beta$-particles are emitted in the transformation ${ }_{92}^{238} U \rightarrow{ }_{92}^{234} U$
A. 1,1
B. 1,0
C. 1,2
D. 2,1

Answer: C

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69. Which of the following particles is emitted in the nuclear reaction: $\cdot 13 A l^{27}+{ }_{.2} H e^{4} \rightarrow \cdot{ }_{14} P^{30+} \ldots$ ?
a). $\left.{ }_{0} n^{1} \mathrm{~b}\right) \cdot{ }_{-1} e^{0}$ c) $\left.\cdot{ }_{1} H^{1} \mathrm{~d}\right) \cdot{ }_{1} H^{2}$
A. ${ }_{0} n^{1}$
B. $-1 e^{0}$
C. $1 H^{1}$
D. $1 H^{2}$

Answer: C

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70. How many $\alpha$-particles are emitted in the nuclear transformation: $\cdot{ }_{84} \mathrm{Po}^{215} \rightarrow{ }_{.82} \mathrm{~Pb}^{211}+{ }^{21}{ }_{2} H e^{4}$
A. 0
B. 1
C. 2
D. 3

Answer: B

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71. The isotope ${ }_{y} A^{x}$ undergoes a series of $m \alpha$ and $n \beta$ disintegrations to form a stable isotope ${ }_{y-10} B^{x-32}$.

## The values of $m$ and $n$ are

A. 6 and 8
B. 8 and 10
C. 8 and 6
D. 5 and 8

Answer: C

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72. Which of the following is a fusion reaction ?

> A. ${ }_{98}^{235} U+{ }_{0}^{1} n \rightarrow{ }_{56}^{141} \mathrm{Ba}+{ }_{36}^{96} \mathrm{Kr}+3{ }_{6}^{1} n$
> B. ${ }_{92}^{239} \mathrm{Fe}+{ }_{0}^{1} n \rightarrow{ }_{92}^{239} \mathrm{U}+\gamma$
C. ${ }_{26}^{55} \mathrm{Fe}+{ }_{1} e^{0} \rightarrow{ }_{25}^{55} \mathrm{Mn}$
D. ${ }_{1}^{1} H+{ }_{1}^{1} H+2{ }_{0}^{1} n \rightarrow{ }_{2}^{4} H e+$ Energy

## Answer: D

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73. Which of the following is a thermonuclear reaction
A. ${ }_{93}^{238} U+{ }_{0}^{1} n \rightarrow{ }_{98}^{239} N p+{ }_{-1}^{0} e$
B. $4_{1}^{1} H \rightarrow{ }_{2}^{4} \mathrm{He}+{ }_{+1}^{0} 2 e$
C. ${ }_{92}^{238} U+{ }_{6}^{12} C \rightarrow{ }_{98}^{246} C f+4{ }_{0}^{1} n$
D. ${ }_{13}^{27} \mathrm{Al}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{15}^{30} \mathrm{P}+{ }_{0}^{1} n$

## Answer: B

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74. The fulture inexhaustible source of energy will be
A. hydrogen

B. Uranium

C. coal
D. natural gas

Answer: A

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75. The nuclear reaction $.{ }_{1}^{2} H+.{ }_{1}^{2} H \rightarrow .{ }_{2}^{4} \mathrm{He}$ is called
A. fission reaction
B. fusion reaction
C. chain reaction
D. thermal reaction
76. To start a nuclear fusion reaction, the temperature required is of the order of
A. $10^{3} \mathrm{~K}$
B. $10^{2} \mathrm{~K}$
C. $10^{5} \mathrm{~K}$
D. More than $10^{6} \mathrm{~K}$

Answer: D

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77. Average life period is equal to

$$
\begin{aligned}
& \text { A. } \frac{1}{t_{0.5}} \\
& \text { B. } \frac{1}{\lambda} \\
& \text { C. }\left(t_{0.5}\right)^{2} \\
& \text { D. } 0 \cdot 75 t_{0.5}
\end{aligned}
$$

## Answer: B

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78. The half life period of four isotopes
(i) 6.7 yr
(ii) $8 \times 10^{3} y r$
(iii) $5760 \mathrm{yr} \quad$ (iv) $2.35 \times 10^{5} \mathrm{yr}$,

The most stable isotope is
A. (i)
B. (ii)
C. (iii)
D. (iv)

## Answer: D

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79. A radioisotope has half life of 10 years. What percentage of the original amount of it would you
expect to remain after 20 years? a) 0 b) 12.5 c) 25 d) 8
A. 0
B. $12 \cdot 5$
C. 25
D. 8

Answer: C

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80. The amount of substance that give $3.7 \times 10^{7} \mathrm{dps}$ is
A. one becquerel
B. one curie
C. one millicurie

## D. one rutherford

## Answer: C

## D Watch Video Solution

81. The mass of 1 curie of $\mathrm{U}-234$
$\left(t_{1 / 2}=2 \cdot 35 \times 10^{5}\right.$ years $)$ is
A. $1 \cdot 548 \times 10^{3} \mathrm{~g}$
B. $15 \cdot 48 g$
C. $1 \cdot 548 \times 10^{-3} \mathrm{~g}$
D. $1 \cdot 548 \times 10^{2} \mathrm{~g}$

Answer: D

## - Watch Video Solution

82. The $t_{0.5}$ of a radioactive substance is 100 days. After

400 days, one gram of element will be reduced to
A. $0 \cdot 5 \mathrm{~g}$
B. $0 \cdot 25 \mathrm{~g}$
C. $0 \cdot 125 \mathrm{~g}$
D. $0 \cdot 625 \mathrm{~g}$

## Answer: D

## - Watch Video Solution

83. A certain nuclide has a half life of 30 minutes. If the sample containing $26 \times 10^{10}$ atoms us allowed ti decay for 90 minutes, how many atoms will remain?
A. $2 \times 10^{10}$ atoms
B. $4.5 \times 10^{9}$ atoms
C. $7.5 \times 10^{9}$ atoms
D. $1.5 \times 10^{9}$ atoms

## D Watch Video Solution

84. If the half of an isotope $X$ is 10 years, its decay
contant is
A. $6.932 y r^{-1}$
B. $0.6932 y r^{-1}$
C. $0.06932 y r^{-1}$
D. $0.006932 y r^{-1}$

Answer: C

- Watch Video Solution

85. The $t_{0.5}$ of a radioactive isotope is 1.5 hours. How long will it take for its activity to be reduced to $1 / 16$ of its original value?
A. 3.0 h
B. 360 min
C. 4.5 h
D. 600 min

Answer: B

- Watch Video Solution

86. The $t_{1 / 2}$ of radioactive $\mathrm{K}-40$ is 5.274 years
$\left(\lambda=2.5 \times 10^{-7} \mathrm{~min}^{-1}\right)$. The decay activity of 2.0 g of
the sample is about
A. $5 \times 10^{5} \mathrm{dpm}$
B. $5 \times 10^{10} \mathrm{dpm}$
C. $7.5 \times 10^{15} \mathrm{dpm}$
D. $7.5 \times 10^{20} \mathrm{dpm}$

## Answer: C

87.8 grams of a radioactive substance is reduced to 0.5
g after 1 hour. The $t_{1 / 2}$ of the radioactive substance is
A. 15 min
B. 30 min
C. 45 min
D. 10 min

## Answer: A

- Watch Video Solution

88. The activity of a sample of $\mathrm{Ti}(\mathrm{Z}=22)$ decreased by
$90 \%$ over a period of 10 years. The half life of the sample is
A. 1 year
B. 2 years
C. 3 years
D. 5 years

## Answer: C

- Watch Video Solution

89. The rate of disintegration of a radioactivity element changes from initial value of $10,000 \mathrm{dpm}$ to $2,500 \mathrm{dpm}$ in 50 days. The decay constant is
A. $\frac{2500}{10000} d^{-1}$
B. $1.386 \times 10^{-2} d^{-1}$
C. $\frac{0.693}{2.303} \times 50 s^{-1}$
D. $2.772 \times 10^{-2} d^{-1}$

## Answer: D

90. Mark the incorrect relation
A. $N_{0}=N e^{\lambda t}$
B. $\tau=1.44 t_{1 / 2}$
C. $N=N_{0}\left(\frac{1}{2}\right)^{n}$
D. $t_{0.5}=\lambda / \ln 2$.

## Answer: D

## D Watch Video Solution

91. A radioactive isotope having $t_{1 / 2}=3$ days was read after 12 days. If 3 g of the isotope is now left in the
container, the initial weight of isotope was
A. 12 g
B. 24 g
C. 36 g
D. 48 g

Answer: D

## D Watch Video Solution

92. If $N_{0}$ is the number of radioactive nuclei initially present , then the number of nuclei remaining undecayed at the end of nth half life is
A. $2^{-n} N_{0}$
B. $2^{-n} N_{0}$
C. $2^{-n} N_{0}$
D. $2^{-n} N_{0}$

## Answer: A

## - Watch Video Solution

93. A radioactive isotope has initial activity of 28 dpm

Its activity is reduced to 14 dpm after half an hour. The initial number of nuclide in sample was:
A. 200
B. 400
C. 600
D. 1200

## Answer: D

## D Watch Video Solution

94. The wt. in g of 1 curie of a radioactive element ${ }^{200} X$
having $t_{1 / 2}$ of 69.3 min is
A. $3.7 \times 10^{-8} \mathrm{~g}$
B. 200 g
C. $7.4 \times 10^{-8} g$
D. $3.0 \times 10^{-8} g$

Answer: C

## - Watch Video Solution

95. Calculate the no. of disintegrations which 1 g of radioactive element X - 200 undergoes per sec. $t_{1 / 2}$ of X
$=1000$ years.
A. $3.66 \times 10^{10} \mathrm{dps}$
B. $6.6 \times 10^{10} \mathrm{dps}$
C. $10^{11} \mathrm{dps}$
D. $1.0 \times 10^{10} \mathrm{dps}$

## - Watch Video Solution

96. Which one of the following is an exact example of artificial radioactivity?

$$
\begin{aligned}
& \text { A. }{ }_{0} n^{1}+{ }_{11} N a^{23} \rightarrow{ }_{11} N a^{24}+\gamma \\
& { }_{11} N a^{24}+{ }_{7} H^{14} \rightarrow{ }_{12} M g^{24}+{ }_{0} n^{1} \\
& \text { B. }{ }_{2}^{11} \mathrm{He}^{4}+{ }_{7} N^{14} \rightarrow{ }_{12} M g^{24}+{ }_{0} n^{1} \\
& { }_{8} \mathrm{O}^{17}+{ }_{0} n^{1} \rightarrow{ }_{7} \mathrm{O}^{18}+\gamma \\
& \text { C. }{ }_{2} \mathrm{He}^{4}+{ }_{13} \mathrm{Al}^{27} \rightarrow{ }_{15} P^{30}+{ }_{0} n^{1} \\
& { }_{15} P^{30} \rightarrow{ }_{14} S i^{30}+{ }_{1} e^{0}
\end{aligned}
$$

D. ${ }_{89} A c^{228} \rightarrow{ }_{90} T h^{228}+\beta$

$$
{ }_{90} T h^{228} \rightarrow{ }_{88} R a^{224}+\alpha
$$

## Answer: C

## D Watch Video Solution

## 97. The first positron emitter discovered was

A. ${ }_{15}^{30} P$
B. ${ }_{14}^{30} S i$
C. ${ }_{4}^{15} P$
D. ${ }_{11}^{24} N a$

## Answer: A

## - Watch Video Solution

98. The isotope of carbon used in radiocarbon dating is
A. ${ }^{12} C$
B. ${ }^{13} C$
C. ${ }^{14} C$
D. ${ }^{15} C$

## Answer: C

99. 20 mg of C-14 has half-life of 5760 yr .100 mg of sample containing C-14 is reduced to 25 mg in
A. 11520 yr
B. 5760 yr
C. 18270 yr
D. 17280 yr

Answer: A

- Watch Video Solution

100. The activity of an old piece of wood is just $1 / 4$ of
the fresh piece of wood. If $t_{1 / 2}$ of $\mathrm{C}-14$ is 6000 years,
the age of the piece of wood is
A. 6000 years
B. 3000 years
C. 9000 years
D. 12000 years

Answer: D

- Watch Video Solution

101. An old piece of wood has 25.6 times as much $C^{14}$ as ordinary wood today has. Find the age of the wood.

Half-life period of $C^{14}$ is 5760 years.
A. 5760 years
B. 11520 years
C. 2880 years
D. 1440 years

Answer: B
102. The analysis of a rock shows that relative no. of ${ }^{206} \mathrm{~Pb}$ and ${ }^{238} U$ atoms is $\mathrm{Pb} / \mathrm{U}=0.25$. If $t_{0.5}{ }^{238} U \rightarrow{ }^{206} \mathrm{~Pb}$ is $4 \times 10^{9}$ years, the age of the rock is
A. $\frac{2.303}{0.693} \times\left(4 \times 10^{9}\right) \log 1.25$
B. $\frac{2.303}{0.693} \times\left(4 \times 10^{9}\right) \log 0.25$
C. $\frac{2.303}{0.693} \times\left(4 \times 10^{9}\right) \log 4$
D. $\frac{2.303}{4 \times 10^{9}} \times 0.693 \times \log 4$

## Answer: A

## D Watch Video Solution

103. A method which uses radioactivity for determining
the age of a prehistoric fossil is called
A. carbon dating
B. deutrerium dating
C. radium dating
D. uranium dating

Answer: A

D Watch Video Solution
104. Which of the following is not a transuranic element?
A. Pu
B. Bi
C. Cm
D. Am

Answer: B

- View Text Solution

105. Which of the following is considered as a synthetic element?
A. Thorium
B. Lead
C. Plutonium
D. Uranium

Answer: C

- Watch Video Solution

106. Which one of the following is not a transuranic element?
A. Californium
B. Thorium
C. Curium
D. Lawrencium

Answer: B

- View Text Solution

107. Which one of the following is not a synthetic element?
A. Technetium
B. Neptunium
C. Astatine
D. Uranium

Answer: D

- Watch Video Solution

108. For treatment of canerous tumors, the radio isotope used was
A. Co-60
B. U-235
C. Pu-239
D. Th-231

Answer: A

D Watch Video Solution
109. Atom bomb is based on
A. nuclear fusion
B. nuclear fission
C. induced radioactivity
D. disintegration

## Answer: B

## - Watch Video Solution

110. The source of enomous energy of sum is
A. fissionof uranium
B. fusion of hydrogen to form helium
C. fusion of deuterium and tritium

# D. fusion of tritium to form helium 

Answer: B

## - Watch Video Solution

111. Nuclear reactors are based on
A. natural radioactivity
B. nuclear fission
C. Nuclear fusion
D. spontaneous chemical reaction
112. Hydroden bombs are based on
A. natural radioactivity
B. nuclear fission
C. Nuclear fusion
D. spontaneous chemical reaction

## Answer: C

D Watch Video Solution
113. The source of energy of the sun is
A. natural radioactivity
B. artifical radioactivity
C. nuclear fission
D. Nuclear fusion

## Answer: D

## - Watch Video Solution

114. The triad of nuclei is isotonic in
A. ${ }_{6}^{14} C,{ }_{7}^{15} N,{ }_{9}^{17} F$
B. ${ }_{6}^{12} C,{ }_{7}^{14} N,{ }_{9}^{18} F$
C. ${ }_{6}^{14} C,{ }_{7}^{17} N,{ }_{9}^{17} F$
D. ${ }_{6}^{14} C,{ }_{7}^{14} N,{ }_{9}^{19} F$

Answer: A

## D Watch Video Solution

115. The energy equivalent to 1 amu is?
A. 280 MeV
B. 932.65 MeV
C. 8.314 J
D. 4.183 MeV
116. Which of the following nuclei is unstable? a). ${ }_{5} B^{10}$
b) ${ }_{4} B e^{10}$ c) $\cdot{ }_{7} N^{14}$ d) $\cdot{ }_{8} O^{16}$
A. ${ }_{5} B^{10}$
B. ${ }_{4} B^{10}$
C. ${ }_{7} N^{14}$
D. ${ }_{8} O^{16}$

Answer: B

- Watch Video Solution

117. The most ratioactive element is
A. uranium
B. Thorium
C. radium
D. Plutonium

## Answer: C

## D Watch Video Solution

118. Which of the following has the maximum penetrating power? a) $\alpha$-particle b)Proton c) $\gamma$-particle
d)Positron
A. $\alpha$-particle
B. proton
C. $\gamma$-radiation
D. positron

Answer: C

## D Watch Video Solution

119. The energy released in an atom bomb explosion is mainly due to
A. release of electrons
B. release of neutrons
C. lower mass of products than initial material
D. greater mass of products tha initial material

## Answer: C

## D Watch Video Solution

120. During the fission of U-235, energy of the order of 180 MeV is generated per nucleus fissioned . The amount of energy released by the fission of 0.235 g of $\mathrm{U}-235$ is
A. $1.73 \times 10^{7} \mathrm{KJ}$
B. $1.08 \times 10^{23} \mathrm{KJ}$
C. $1.73 \times 10^{16} \mathrm{KJ}$
D. $1.08 \times 10^{7} \mathrm{KJ}$

Answer: A

## D Watch Video Solution

121. If the mass defect of ${ }_{4}^{9} X$ is 0.09 a.m.u. then the binding energy per nucleon is
(1 a.m.u= 931.5 MeV )
A. 9.315 MeV
B. 931.5 MeV
C. 83.8 MeV
D. 8.38 MeV

## Answer: A

## - Watch Video Solution

122. Which of the following statements about radioactivity are correct? a)It is a nuclear property b)It does not involve any rearragement of electrons. c)It is not affected by the presence of other elements. d)Its rate is affected by the change in temperature and/or pressure.
A. It is a nuclear property
B. It does not involve any rearrangement of electrons
C. it is not affected by the presence of other elements
D. Its rate is effected by change in temperature and/or pressure

## Answer: D

## - Watch Video Solution

123. Radioactive disintegration differs from a chemical change inbeing a)An exothermic change b)A
A. and exothermic change
B. a sponthaneous process
C. a nuclear process
D. a unimolecular firs order reaction

## Answer: C

## - Watch Video Solution

124. Neutrons are more effective projectiles than protons because they
A. are attracted by the nuclei
B. are not repelled by the nuclei
C. travel with high speed
D. None of the above

## Answer: B

## - Watch Video Solution

125. $\beta$-rays
A. have greater ionising power than $\alpha$-rays
B. possess greater penetrating power than $\gamma$-rays
C. are ejected when light falls on active metals

# D. carry charge opposite in sign but equal in 

 magnitude to that on proton.
## Answer: D

## - Watch Video Solution

126. The half life of radium is 1600 years. After how much time will 1 g radium be reduced to 125 mg ?
A. 800 years
B. 1600 years
C. 3200 years
D. 4800 years

## Answer: D

## - Watch Video Solution

127. The half life period of a radioactive material is 15 minutes. What percent will remain after 45 minutes?
A. $10 \%$
B. $12.5 \%$
C. $15 \%$
D. $17.5 \%$

Answer: B
128. A radioactive isotope having a half life of 3 days was received after 12 days. It was found that there were 3 gm of the isotopes in the container. The initial weight of the isotope when packed was a) 12 gm b) 24 gm c) 36 gm d) 48 gm
A. 12 g
B. 24 g
C. 36 g
D. 48 g

Answer: D
129. The half life of the radioactive element is 35 years.

If there are $4 \times 10^{6}$ nuclei at the start then after how many years $0.5 \times 10^{6}$ of them would be left ?
A. 35
B. 70
C. 105
D. 140

Answer: C
130. The weight of 1 curie $.82 P b^{214}\left(t_{1 / 2}=26.8 \mathrm{~min}\right)$ in grams is
A. $3.1 \times 10^{-8} \mathrm{~g}$
B. $1.55 \times 10^{-8} \mathrm{~g}$
C. $6.2 \times 10^{-8} \mathrm{~g}$
D. $3.1 \times 10^{-10} \mathrm{~g}$

## Answer: A

## D Watch Video Solution

131. The activity of a sample of ${ }_{16}^{36} S$ falls to $25 \%$ of its initial value after 174.2 days. The half life period of ${ }_{16}^{36} S$
A. 174.2 days
B. 87.08 days
C. 17.42 days
D. 10 days

## Answer: B

## - Watch Video Solution

132. Radium has atomic weight 226 and a half-life of

1600 Yr. The number of disintegrations produced per
second from one gram are
A. $4.8 \times 10^{10}$
B. $9.2 \times 10^{6}$
C. $3.7 \times 10^{10}$
D. zero

## Answer: C

## - Watch Video Solution

133. The number of $\alpha$-particle emitted per second by 1
$g$ of Ra-226 is $3.7 \times 10^{10}$. Find the decay constant
A. $1.39 \times 10^{-11} \mathrm{sec}^{-1}$
B. $13.9 \times 10^{-11} \mathrm{sec}^{-1}$
C. $3.7 \times 10^{-11} \mathrm{sec}^{-1}$
D. $2.78 \times 10^{-11} \sec ^{-1}$

Answer: A

## - Watch Video Solution

134. The amount of $\mathrm{C}-14$ in a piece of wood is found to be $1 / 6$ of the amount present in a fresh piece of wood.

What is the age of the wood ? $\left(t_{1 / 2}\right.$ for C-14 $=5770$
years)
A. 14935 years
B. 11540 years
C. 5770 years
D. 17310 years

## Answer: A

## - Watch Video Solution

135. A 12 mL sample of an aqueous solution containing
$2 \times 10^{6}$ counts per sec of tritium is injected into the blood stream of an animal. After complete circulatory mixing , a 1 mL sample was drawn and found to have an activity of $1.5 \times 10^{4}$ counts. Calculate blood volume of the animal.

$$
\text { A. } 1.33 \times 10^{2} \mathrm{~mL}
$$

B. $2 \times 10^{6} \mathrm{~mL}$
C. $1.5 \times 10^{4} \mathrm{~mL}$
D. $2.66 \times 10^{2} \mathrm{~mL}$

Answer: A

## - Watch Video Solution

136. If a hospital buys 4 g of pure Co-60 for therapeutic use, then after 20 years of use the sample of Co-60 will be ( $t_{1 / 2}$ for Co-60 $=5$ years)
A. 0.25 g
B. 0.50 g
C. 0.33 g
D. 0.66 g

Answer: A

## - Watch Video Solution

137. A radioactive isotope decays to such a rate that after 96 min only $1 / 8$ th of the original amount remains.

The value $t_{1 / 2}$ of this nuclide is
A. 12.0 min
B. 32.0 min
C. 24.0 min
D. 48.0 min

Answer: B

## - Watch Video Solution

138. Radioactivity of a radioactive element remains
$1 / 10$ of the original radioactivity after 2.303 seconds.
The half life period is
A. 2.303 seconds
B. 23.03 seconds
C. 0.693 seconds
D. 0.0693 seconds

## Answer: C

## - Watch Video Solution

139. A radioactive disintegration of ${ }_{90} T h^{232}$ yields ${ }_{82} P^{208}$ in the end. The number of $\alpha$ and $\beta$-particle emitted will be
A. $6 \alpha$ and $6 \beta$
B. $5 \alpha$ and $5 \beta$
C. $6 \alpha$ and $4 \beta$
D. $4 \alpha$ and $6 \beta$

## - Watch Video Solution

140. The half life of a radioactive isotope 25 days. After what time it will disintegrate $75 \%$
A. 50 days
B. 48 days
C. 24 days
D. 125 days

Answer: A
141. Chlorine has two isotope ${ }_{17} \mathrm{Cl}^{35} \mathrm{Cl}^{35}$. The atomic weight of chlorine is 35.5 . In what ratio $\mathrm{Cl}^{35}$ and $\mathrm{Cl}^{37}$ are present in chlorine ?
A. 1:3
B. 3:1
C. 1:5
D. 5: 1

Answer: B

- Watch Video Solution

142. After a period of 100 days the radioactive of an isotope remains $1 / 4$ th of the original activity . The half life of the isotope is
A. 25 days
B. 50 days
C. 75 days
D. 100 days

Answer: B
143. An archeological sample of wood has half $C^{14}$ activity as compared to that found in fresh wood of the same plant. The half life of $C^{14}$ is 5770 years. The age of archiological sample of wood will be
A. 5770 years
B. 2885 years
C. 11,540 years
D. 1445 years

Answer: A
144. The half life of a radioactive isotope is 3 days.

When it was weighted after 12 days its weight was found to be 3 g . The original weight of the substance is
A. 36 g
B. 24 g
C. 48 g
D. 12 g

Answer: C

- Watch Video Solution

145. 1 mg of a radioactive substance starts decaying .

How much substance will be left after 24 hours ? Half
life is 8 hours.
A. $\frac{1}{2} \mathrm{mg}$
B. $\frac{1}{4} \mathrm{mg}$
C. $\frac{1}{8} \mathrm{mg}$
D. $\frac{1}{16} \mathrm{mg}$

Answer: C

- Watch Video Solution

146. Half life of a radioactive substance is 15 seconds.

After 15 seconds what percentage of activity will be left
?
A. $15 \%$
B. $18 \%$
C. $12.5 \%$
D. $10 \%$

Answer: C

D Watch Video Solution
147. The half life of a radioisotope is 1.5 hours is (the initial mass of isotope is 32 g )
A. 32 g
B. 16 g
C. 30 g
D. 2 g

## Answer: C

- Watch Video Solution

148. A radioisotope having a half life of 3 days was received after 12 days. It was found there were 3 g of the isotope in the container. The initial weight of the isotope when packed was
A. 12 g
B. 24 g
C. 36 g
D. 2 g

## Answer: D

149. If $25 / 26$ quantity of a ratioactive element disintegrates in two hours, its half life would be

A. 1 hour

B. 45 minutes
C. 30 minutes
D. 15 minutes

## Answer: C

## D Watch Video Solution

150. Two radioactive nuclides $A$ and $B$ have half life of $t$ and $2 t$ respectively. If we start an experiment with one
mole of each of them, what will be the mole ratio after a time interval of 6 t ?
A. 1:2
B. 1: 8
C. 1: 6
D. 1:1

## Answer: B

## - Watch Video Solution

151. A freshly prepared radioactive source of half life period of 2 hour emits radiations of intensity which is

64 times the permissible safe level. Minimum time after which it would be possible to work with the source is
A. 6 hr
B. 12 hr
C. 24 hr
D. 48 hr

## Answer: B

## - Watch Video Solution

152. The radium and uranium atoms in a sample of uranium mineral are in the ratio of $12.8 \times 10^{6}$. If half
life period of radium is 1620 years, the half life period of uranium will be
A. $45.3 \times 10^{9}$ years
B. $4.53 \times 10^{10}$ years
C. $4.53 \times 10^{9}$ years
D. $4.53 \times 10^{10}$ years

## Answer: C

## - Watch Video Solution

153. The activity of carbon-14 in a piece of ancient wood is only $12.5 \%$. If the half life period of carbon-14 is 5760
years, the age of the piece of wood will be
A. $17.281 \times 10^{2}$ years
B. $172.81 \times 10^{2}$ years
C. $1.7281 \times 10^{2}$ years
D. $1728.1 \times 10^{2}$ years

Answer: B

## - Watch Video Solution

154. The activity of a radioactive nucleide $\left(X^{100}\right)$ is 6.023 curie. If its disintegration constant is $3.7 \times 10^{10} \mathrm{sec}^{-1}$, the mass of X is
A. $10^{-3} \mathrm{~g}$
B. $10^{-15} \mathrm{~g}$
C. $10^{-6} \mathrm{~g}$
D. $10^{-14} \mathrm{~g}$

## Answer: B

## - Watch Video Solution

155. A radioactive sample has initial activity of 28 dpm

30 minutes later its activity 14 dpm . How many atoms of nuclide were present initially?
A. 1200
B. 400
C. 600
D. 800

Answer: A

## D Watch Video Solution

156. 1 Mole of an $\alpha$-emitting nuclide with $t_{1 / 2}=10$ hous, is placed in a sealed container. The time in which $4.52 \times 10^{23}$ molecules of He will accumulate is
A. 4.52 hr
B. 9.40 hr
C. 10.10 hr
D. 20.00 hr

## Answer: D

## - Watch Video Solution

157. half life of radium is 1580 years. Its average life will be
A. $8.25 \times 10^{2}$ years
B. $1.8 \times 10^{3}$ years
C. $2.5 \times 10^{3}$ years
D. $2.279 \times 10^{3}$ years

## Answer: D

## - Watch Video Solution

158. The weight in grams of 1 curie of radioactive element X-200 having a $t_{1 / 2}$ of 69.3 min is
A. $3.0 \times 10^{-8} \mathrm{~g}$
B. $3.7 \times 10^{-8} \mathrm{~g}$
C. $7.4 \times 10^{-8} \mathrm{~g}$
D. 100 g

Answer: C
159. $R a^{226}$ has half life of 1600 years. The number of disintegration per second per gram is
A. $4.8 \times 10^{10}$
B. $9.2 \times 10^{5}$
C. $3.7 \times 10^{10}$
D. None of these

## Answer: C

# 160. What is the packing fraction of ${ }_{26}^{56} \mathrm{Fe}$ ? 

A. +14.167<br>B. -14.167<br>C. +73.90<br>D. -73.90

## Answer: B

## D Watch Video Solution

161. The isotoic mass of ${ }_{92}^{238} U$ is 238.125 a.m.u. Its packing fraction is
A. +5.25
B. -5.25
C. +12.5
D. -12.5

## Answer: A

## - Watch Video Solution

## Revision Questions from Competitive Exams

1. From the reaction given below, deduce the group of
polonium in the periodic table ( Pb belongs to group
14) 

${ }_{.84} \mathrm{Po}^{210} \rightarrow{ }_{.82} \mathrm{~Pb}^{206}+{ }_{.2} \mathrm{He}^{4}$
A. 2
B. 14
C. 6
D. 16

## Answer: D

## - Watch Video Solution

2. Which of the following does not contain material
A. $\alpha$-rays
B. $\beta$-rays
C. anode rays
D. $\gamma$-rays

## Answer: D

## - Watch Video Solution

3. Radioactive is due to
A. stable electrons configuration
B. stable nucleus
C. unstable nucleus

## D. unstable electronic configuration.

## Answer: C

## D Watch Video Solution

4. $C^{14}$ has a half - life of 5760 years. 100 mg of the sample containing $\cdot{ }^{14} C$ is reduced to $25 m g$ in
a)11520years b)2880years c)1440years d)17128years
A. 11.520 yrs
B. 2880 yrs
C. 1440 yrs
D. 17280 yrs

## Answer: A

## D Watch Video Solution

5. The reaction
${ }_{.1} D^{2}+{ }_{.1} T^{3} \rightarrow{ }_{.2} H e^{4}+{ }_{.0} n^{1}$
is an example of a)Nuclear fission b)Nuclear fusion
c) Artifical radioactivity d)Radioactive disintegration
A. nuclear fission
B. nuclear fusion
C. artifical radioactivity
D. radioactive disintegration

## - Watch Video Solution

6. A radioactive isotope decays at such a rate that after

96 min, only 1 / $8 t h$ of the original amount remains.

The value of $t_{1 / 2}$ of this nuclide is
a. $12 \min$ b. $32 \min \mathrm{c} .24 \min \mathrm{~d} .48 \mathrm{~min}$
A. 12.0 min
B. 32.0 min
C. 24.0 min
D. 48.0 min

## - Watch Video Solution

7. Which of the following is used as neutron absorber in the nuclear reactor?

A. water

B. Deuterium
C. Some compound to uranium
D. Cadmium

Answer: D
8. Insert the missing figure in the following ${ }^{-25} M n^{55}(n, \gamma) \rightarrow$
a. ${ }_{25} M n^{56}$ b. ${ }_{24} C r^{56}$ c. ${ }_{24} M n^{56}$ d. ${ }_{24} C r^{56}$
A. ${ }_{25}^{55} \mathrm{Mn}$
B. ${ }_{24}^{55} \mathrm{Cr}$
C. ${ }_{25}^{55} \mathrm{Mn}$
D. ${ }_{24}^{56} \mathrm{Cr}$

Answer: A
9. The half life of a radioactive element is 30 min . One sixteenth of the original quantity of element will be left after
a. 1 hr b. $16 \mathrm{hrc} .4 \mathrm{hrd}$.
A. 1 hrs
B. 16 hrs
C. 4 hrs
D. 2 hrs

## Answer: D

10. If the amount of radioactive substance is increased
three times, the number of atoms disintegrated per ubit time would :
A. doubled
B. tripled
C. one third
D. unchanged

Answer: B

- Watch Video Solution

11. A radioactive sample has half life of 1500 years. A sealed tube containing 1 g of sample will be containing ...... of the sample after 3000 years. The missing figure is
A. 1 g
B. 0.5 g
C. 0.25 g
D. 0 g

Answer: C
(D) Watch Video Solution
12. In nuclear reaction
${ }_{\cdot 4} B e^{9}+{ }_{.2} H e^{4} \rightarrow{ }_{.6} C^{12}+X, X$ will be
A. 4
B. 8
C. 6
D. 9

Answer: D

- Watch Video Solution

13. In a radioactive decay, an emitted electron comes from
A. nucleus of the atom
B. the orbital with principal quantum number 1
C. inner orbital of atoms
D. the outermost shell of atom

## Answer: A

- Watch Video Solution

14. Which of the following statements is wrong ?
A. $P^{33}$ is used in the treatment of Leukemia
B. $I^{131}$ is used in the treatment of Thyroid Gland

## Cancer

C. $\mathrm{Co}^{59}$ can't be used for treatment of Cancer
D. Excessive use of radioactive elements is responsible for cancerous growth.

## Answer: A

## D Watch Video Solution

15. Half life of radioactive element is 100 yrs . The time in which it disintegrate $50 \%$ of its mass will be
A. 50 yrs
B. 200 yrs
C. 100 yrs
D. 25 yrs

## Answer: C

## - Watch Video Solution

16. Energy released in the nuclear fusion reaction is :
${ }_{1}^{2} H+{ }_{1}^{3} H \rightarrow{ }_{2}^{4} H e+{ }_{0}^{1} n$
Atomic
mass
${ }_{1}^{2} H=2.014,{ }_{1}^{3} H=3.016{ }_{2}^{4} H e=4.303,{ }_{0}^{1} n=1.009$ (all
in a.m.u.)
A. 16.60 MeC
B. 500 J
C. $4 \times 10^{67} \mathrm{Kcal}$
D. 8.30 eV

## Answer: A

## - Watch Video Solution

17. Positron has mass equal to
A. electron
B. $\alpha$-particle
C. protons

## D. deutron

Answer: A

## - Watch Video Solution

18. Which of the following is ( n, ) type rection ?
A. ${ }_{5} C^{13}+{ }_{1} H^{1} \rightarrow{ }_{6} C^{14}$
B. ${ }_{7} N^{14}+{ }_{1} H^{1} \rightarrow{ }_{8} O^{15}$
C. ${ }_{13} A l^{27}+{ }_{0} n^{1} \rightarrow{ }_{12} M g^{27}+{ }_{1} H^{1}$
D. ${ }_{92} U^{235}+{ }_{0} n^{1} \rightarrow{ }_{54} X e^{140}+{ }_{88} S r^{94}$

## Answer: C

19. Half life of a radioactive substance is 60 min . After 3
hours, the fraction of total number of atoms that have decayed would be
A. $12.5 \%$
B. $87.5 \%$
C. $8.5 \%$
D. $25 \%$

Answer: B
20. In radioactive transformation ${ }_{92} U^{235} \rightarrow{ }_{82} \mathrm{~Pb}^{206}$,
the number of $\alpha$ and $\beta$ particles emitted are
A. $10 \alpha, 6 \beta$
B. 4 protons, 8 neutrons
C. 6 electrons, 8 protons
D. $6 \beta, 8 \alpha$

## Answer: D

## - Watch Video Solution

21. Which of the following statements is false?
A. In chlorine gas, the ratio of ${ }^{35} \mathrm{Cl}$ and ${ }^{37} \mathrm{Cl}$ is $1: 3^{`}$
B. Hydrogen bomb is based on the principle of nuclear fusion
C. The atom bomb is based on the principle of nuclear fission
D. The penetrating power of proton is less than that of electron

## Answer: A

## - Watch Video Solution

22. The composition of tritium is
A. 1 electron , 1 proton, 1 neutron
B. 1 electron, 2 protons, 1 neutron
C. 1 electron, 1 proton, 2 neutrons
D. 1 electron, 1 proton, 3 neutrons.

## Answer: C

## - Watch Video Solution

23. Isotopes of elements were discovered by
A. Soddy
B. Curie
C. Chadwick

# D. Thomson 

Answer: A

## D Watch Video Solution

24. The number of electrons in the nucleus of $C^{12}$ is
A. 6
B. 12
C. 17
D. 0

## Answer: D

25. In the reaction ItBrgt ${ }_{7} \mathrm{~N}^{14}+{ }_{2} \mathrm{He}^{4} \rightarrow{ }_{a} \mathrm{X}^{b}+{ }_{1} \mathrm{H}^{1}$
the nucleus X is
A. $\mathrm{N}-16$
B. $\mathrm{N}-17$
C. 0-16
D. 0-17

Answer: D

- Watch Video Solution

26. The radioactive decay of ${ }_{35} X^{88}$ by a $\beta$-emission produces an unstable nucleus which spontaneously emits a neutron. The final product is
A. ${ }_{37} X^{88}$
B. ${ }_{35} X^{89}$
C. ${ }_{34} Z^{38}$
D. ${ }_{36} W^{87}$

Answer: D

- Watch Video Solution

27. After emission of one $\alpha$ particle followed by one $\beta$ particle from ${ }_{92}^{238} X$, the number of neutrons in the atom will be
A. 142
B. 146
C. 144
D. 143

Answer: D

- Watch Video Solution

28. Heavy water is used as moderator in a nuclear reactor. The function of the moderator is
A. to slow down the speed of neutron
B. to increase the speed on neutron
C. to produce more neutrons
D. to stop the nuclear reaction

## Answer: A

- Watch Video Solution

29. By removing, one $\beta$-particle from a radio active nucleus, the atomic number
A. increases by one
B. decreases by one
C. no change
D. increases by two

## Answer: A

## - View Text Solution

30. Which of the following is used as control rod ?
A. Cadmium rod
B. Graphite rod
C. Boron
D. Both (A) and (C)

## Answer: D

## - Watch Video Solution

31. Which is used as moderator in nuclear reactor?
A. $D_{2} O$
B. Alum
C. $\mathrm{H}_{2} \mathrm{O}$

## D. None of these

Answer: A

## - Watch Video Solution

32. 1.0 g of a radioactive isotope left 125 mg after 24 hr .

The half-life period of the isotope is
a. $8 \mathrm{hrb} .24 \mathrm{hrc} .6 \mathrm{hr} \mathrm{d}$.
A. 8 hours
B. 24 hours
C. 6 hours
D. 4 hours

## Answer: A

## - Watch Video Solution

33. A radioactive substance has a half life of 60 minutes.

After 3 hours, the fraction of atom that have decayed would be.
A. $17.5 \%$
B. $12.5 \%$
C. $25 \%$
D. $50 \%$

## - Watch Video Solution

34. Which does not take place by $\alpha$ disintegration ?
A. ${ }_{92} U^{238} \rightarrow{ }_{90} U^{234}$
B. ${ }_{90} T H^{232} \rightarrow{ }_{88} R a^{228}$
C. ${ }_{88} R a^{226} \rightarrow{ }_{86} R n^{222}$
D. ${ }_{83} B i^{213} \rightarrow{ }_{84} P_{o}{ }^{213}$

## Answer: D

35. A radioactive element X emits $3 \alpha$, one beta and one gamma-particles and forms ${ }_{76} Y^{225}$ Element X is
A. ${ }_{81}^{238} X$
B. ${ }_{80}^{2237} X$
C. ${ }_{80}^{237} X$
D. ${ }_{80}^{236} \mathrm{X}$

## Answer: A

## - Watch Video Solution

36. Which is correct statement ?
A. Isotopes are always radioactive
B. $\alpha$ rays are always negatively charged
C. $\beta$-rays are always negatively charged
D. $\gamma$-rays can be deflected in a magnetic field

## Answer: C

## - Watch Video Solution

37. Which is not emitted by radioactive substance ?
A. $\alpha$-rays
B. $\beta$-rays
C. positron
D. Proton

Answer: D

## (D) Watch Video Solution

38. Positron is -
A. Electron with + ve charge
B. a helium nucleus
C. a nucleus with two protons
D. a nucleus with one neutron and one proton.

## Answer: A

39. $U^{235}+n^{1} \rightarrow$ fission product + neutron +3.2
$\times 10^{-11} j$. The energy released, when $\lg$ of $u^{235}$ finally
undergoes fission, is
A. $12.75 \times 10^{8} 8 \mathrm{KJ}$
B. $18.60 \times 10^{9} \mathrm{KJ}$
C. $8.21 \times 10^{7} \mathrm{KJ}$
D. $6.55 \times 10^{6} \mathrm{KJ}$

Answer: C

- Watch Video Solution

40. Which element is the end product of every natural radioactive series?
A. Pb
B. Sn
C. C
D. Bi

Answer: A

- View Text Solution

41. In radioactive decay, which one of the following moves the fastest ?
A. $\alpha$-particle
B. $\beta$-particle
C. $\gamma$-rays
D. positron

Answer: C

- Watch Video Solution

42. Which one of the following notations shows the product incorrectly ?
A. ${ }_{96} C m^{242}(\alpha, 2 n){ }_{97} B K^{243}$
B. ${ }_{5} B^{10}(\alpha, n){ }_{7} N^{13}$
C. ${ }_{7} N^{14}(n, p){ }_{6} C^{14}$
D. ${ }_{14} S i^{28}(d, n){ }_{15} P^{29}$

## Answer: A

## - Watch Video Solution

43. In terms of energy 1 a.m.u. is equal to
A. 100 J
B. 932.1 MeV
C. 931.1 k cal
D. $10^{7}$ ergs

## Answer: B

## - Watch Video Solution

44. The end product of $(4 n+2)$ disintegration series is
A. ${ }_{82}^{204} \mathrm{~Pb}$
B. ${ }_{82}^{208} \mathrm{~Pb}$
C. ${ }_{82}^{209} \mathrm{~Pb}$
D. ${ }_{82}^{206} \mathrm{~Pb}$

Answer: D

## D Watch Video Solution

45. If ${ }_{90} T h^{238}$ disintegrates to ${ }_{83} B i^{212}$, then the number $\alpha$ and $\beta$ particles emitted is
A. $4 \alpha$ and $7 \beta$
B. $4 \alpha$ and $1 \beta$
C. $4 \alpha$ only
D. $7 \beta$ only

## - View Text Solution

46. What is $X$ in the nuclear reaction
${ }_{.7} N^{14}+{ }_{.1} H^{1} \rightarrow{ }_{.8} O^{15}+X$
A. ${ }_{0} n^{1}$
B. $-1 e^{0}$
C. $+1 e^{0}$
D. $\gamma$

Answer: D
47. The radioactive isotope used to estimate the age of ancient geological formations is
A. $O^{16}$
B. $P b^{212}$
C. $F e^{59}$
D. $C^{14}$

## Answer: D

48. The half life period of a radioctive element is 140 days. Afte 560 days, one gram of the element will reduced to : a) $\frac{1}{2} g$ b) $\frac{1}{4}$ g c) $\frac{1}{8} g$ d) $\frac{1}{16}$ g
A. $1 / 2$
B. $1 / 4$
C. $1 / 8$
D. $1 / 16$

Answer: D
49. Number of neutrons i8n a parent nucleus $X$, which gives.${ }_{7}^{14} N$ after two sucessive $\beta-$ emission would be:
A. 6
B. 7
C. 8
D. 9

Answer: D

- Watch Video Solution

50. The activity of radionuclide $\left({ }^{100} X\right)$ is 6.023 curie. If the disintegration constatnt is a) $3.7 \times 10^{4} \mathrm{sec}^{-1}$,the mass of radionuclide is b) $\left.\left.10^{-6} \mathrm{~g} \mathrm{c}\right) 10^{-15} \mathrm{~g} \mathrm{~d}\right) 10^{-3} \mathrm{~g}$
A. $10^{-14} g$
B. $10^{-6} \mathrm{~g}$
C. $10^{-15} \mathrm{~g}$
D. $10^{-3} \mathrm{~g}$

## Answer: C

51. The symbol $x$ in the following equation is
${ }_{11} N a^{23}+{ }_{1} H^{1} \rightarrow{ }_{12} M g^{23}+x$
A. A neutron
B. A deutron
C. A positron
D. An $\alpha$-particle

Answer: A

- Watch Video Solution

52. The half - life of ${ }_{92} U^{238}$ against $\alpha$ - decay is
$4.5 \times 10^{9}$ years. How many disintegrations per second occur in 1 g of ${ }_{.92} U^{238} ?$
A. $9.0 \times 10^{9}$ years
B. $13.5 \times 10^{9}$ years
C. $4.5 \times 10^{9}$ years
D. $4.5 \times 10^{4.5}$ years

## Answer: C

53. Sulphur 35(34,96903 amu) emits a $\beta$ - particles but no $\gamma$-rays. The product is chlorine $-35(34,96885$ $\mathrm{amu})$, The maximum energy carried by $\beta$ - particle is:
A. 16.758 MeV
B. 1.6758 MeV
C. 0.16758 MeV
D. 0.016758 MeV

## Answer: C

## D Watch Video Solution

54. In the following radioactive decay,
${ }_{92} U^{238} \rightarrow(89) Y^{220}$, how many $\alpha$ and $\beta$ particles are ejected from X to form Y ?
A. $3 \alpha$ and $3 \beta$
B. $4 \alpha$ and $3 \beta$
C. $3 \alpha$ and $5 \beta$
D. $5 \alpha$ and $5 \beta$

Answer: A
55. The half-life of a radioactive isotope is 3 h . if the initial mass of the isotope was 300 g , the mass which remained undercayed in 18 h would be
A. 2.34 g
B. 1.17 g
C. 9.36 g
D. 4.68 g

Answer: D

- Watch Video Solution

56. $\beta$-particles are
A. Charge particles emitted from nucleus
B. neutral particle orbiting nucleus
C. a particle produced by splitting of $\sigma$ into H and $n_{0}^{1}$
D. high energy positively charged particles emitted from nucleus

## Answer: A

57. What will be half life period of a nucleus if at the end of 4.2 days, $\mathrm{N}=0.798 N_{0}$ ?
A. 15 days
B. 10 days
C. 12.83 days
D. 20 days

## Answer: C

- Watch Video Solution

58. If 2.0 g of a radioactive substance has $t_{1 / 2}$ of 7 days , the half life of 1 g sample is
A. 7 days
B. 14 days
C. 28 days
D. 35 days

## Answer: A

## - Watch Video Solution

59. Neutron was discovered by

# A. Chadwick 

B. Rutherford
C. Yukank
D. Dalton

## Answer: A

## - Watch Video Solution

60. Isobar of a nucleide is formed when .....takes place?
A. $1 \alpha$-emission
B. $1 \beta$-emission
C. $1 \alpha$ and $1 \beta$ emission
D. $2 \alpha$ and $1 \beta$-emission

Answer: B

## - Watch Video Solution

# 61. After 2 hr the radioactive substance becomes $1 / 16$ th 

of original amount. The $t_{1 / 2}$ in minutes is
A. 60 min
B. 120 min
C. 30 minutes
D. 15 minutes

## Answer: C

## - Watch Video Solution

62. The reaction ${ }_{7} N^{14}+{ }_{0} n^{1} \rightarrow{ }_{6} C^{14}+X$
requires emission of
A. ${ }_{2}^{4} \mathrm{He}$
B. ${ }_{1}^{1} H$
C. ${ }_{0}^{1} n$
D. $-1 e^{0}$

Answer: B

# 63. Positron was so named by 

A. Rutherford
B. Fermi
C. Valrava
D. Anderson

## Answer: D

64. The number of $\alpha$ and $\beta$ particles emitted in nuclear reaction ${ }_{90} T h^{228} \rightarrow{ }_{0} T h^{228}$ are respectively
A. 4,1
B. 3,7
C. 8,1
D. 4,7

Answer: A

- Watch Video Solution

65. Wooden article and freshly cut tree show activity 7.6
and $15.2 \mathrm{~min}^{-1} g^{-1}$ of carbon $\left(t_{1 / 2}=5760 \mathrm{year}\right)$ respectively. The age of the article is a)5760 year b)
$5760 \times \frac{15.2}{7.6}$ year
c) $5760 \times \frac{7.6}{15.2} y e a r$
$5760 \times 15.2-7.6 y e a r$
A. 5760 yrs
B. $5760\left(\frac{15.6}{7.8}\right)$ yrs
C. $5760 \times 7.8 / 15.6 \mathrm{yrs}$
D. $5760 \times(15.6-7.8) \mathrm{yrs}$

## Answer: A

66. A radioactive isotope having $t_{\frac{1}{2}}=2.3$ days was received after 9.2 days. It was found that 300 mg of the isotope was left in the container. The initial amount of the isotope was
A. 4800 mg
B. 2400 mg
C. 1200 mg
D. 3600 mg

Answer: A
67. A sample of radioactive substance with a $t_{1 / 2}=3$ days was found to contain 3 g of it, when received exactly after 12 days. The amount of radioactive substance when it was sealed was
A. 6 g
B. 12 g
C. 24 g
D. 48 g

## Answer: D

68. A human body required the 0.01 M activity of radioactive substance after 24 h. Half life of radioactive substance is 6 h. Then injection of maximum activity of radioactie substance that can be injected will be
A. 0.08
B. 0.04
C. 0.16
D. 0.32

## Answer: C

69. If ${ }_{a} X^{b}$ emits firstly a positron, then two $\alpha$ and two $\beta$ and in the last $\alpha$ is emitted and finally it converts to ${ }_{d}^{c} Y$
. The correct relation is
A. $a=C+12, d=b-5$
B. $a=c+8, d=b-1$
C. $a=c+6, d=b-2$
D. $a=c+4, d=b-2$

Answer: A

## - Watch Video Solution

70. In the case of a radioisotope, the value of $t_{1 / 2}$ and $\lambda$ are identical in magnitude. The value is
A. 1/0.693
B. $(0.693)^{1 / 2}$
C. 0.693
D. $(0.693)^{1 / 2}$

Answer: D

- Watch Video Solution

71. Half life of a radioactive substance which disintegrates by $75 \%$ in 60 min be
A. 120 min
B. 30 min
C. 45 min
D. 20 min

Answer: B

- View Text Solution

72. The half life period of a radioactive element is 90 minutes. What percentage of radioactive element will be present after 6 hours of decomposition ?
A. $25 \%$
B. $6.25 \%$
C. $50 \%$
D. $12.5 \%$

Answer: B

- Watch Video Solution

73. A sample of eood decayed to $1 / 16$ of its original value. What is the number of $t_{1 / 2}$ ?
A. 3
B. 4
C. 8
D. 16

Answer: B

- Watch Video Solution

74. ${ }^{226} R a$ disintegrates at such a rate that after 3160 years, only one fourth of its original amount remains. The half life of ${ }^{226} R a$ will be
A. 790 years
B. 3160 years
C. 1580 years
D. 6230 years

Answer: C
(D) Watch Video Solution
75. ${ }_{Z} X^{M}+{ }_{2} \mathrm{He}^{4} \rightarrow{ }_{15} P^{20}+{ }_{0} n^{1}$
A. $Z=12, M=17$
B. $Z=13, M=28$
C. $\mathrm{Z}=12$, M 27
D. $Z=13, M=27$

## Answer: D

## D Watch Video Solution

76. ${ }_{92} U^{235}$ nucleus absorbs a neutron and disintegrates into ${ }_{54} X e^{139} \cdot{ }_{38} S r^{94}$ and X . What will be the product X
A. 3 neutrons
B. 2 neutrons
C. $\alpha$-particles
D. $\beta$-particles.

Answer: A

## - Watch Video Solution

77. 92 $U^{238} \xrightarrow{\alpha} A \xrightarrow{\beta}{ }_{x}^{y} B$

What are $x$ and $y$ ?
A. 90,234
B. 91,234
C. 92,234
D. 93,234

## Answer: B

## D Watch Video Solution

78. Fill in the blank
${ }_{92} U^{235}+{ }_{0} n^{1} \rightarrow ?+{ }_{36}^{92} K r+3{ }_{0}^{1} n$
A. ${ }_{56}^{141} B a$
B. ${ }_{56}^{139} \mathrm{Ba}$
C. ${ }_{56}^{139} B a$
D. ${ }_{54}^{141} \mathrm{Ba}$

Answer: A

## - Watch Video Solution

79. Half life of a radioactive particle is 1 second. The initial amount of $A$ is 1000 . Then after 3 seconds, $A$ will be
A. 500
B. 250
C. 125
D. 333

## Answer: C

## - Watch Video Solution

80. The age of most ancient geological formations is estimated by a) $C-14$ dating method b) $K-A g$ $\operatorname{method} \mathrm{c}) U-P b$ method d) $R a-R n$ method
A. Potassium argon method
B. Carbon-14 dating method
C. Radium and silicon method
D. Uranium lead method.

## D Watch Video Solution

81. A radioisotope will not emit
A. alpha and beta rays simultaneously
B. beta and gamma rays simultaneously
C. gamma and alpha rays simultaneously
D. gamma rays only

## Answer: D

- View Text Solution

82. $C^{14}$ is
A. an artifical radioactive isotope
B. a natural radioactive isotope
C. a natural non-radioactive isotope
D. an artifical non-radioactive isotope

## Answer: B

## - View Text Solution

83. Which one of the following radioisotopes is used in
the treatment of blood cancer?
A. $P^{32}$
B. $C o^{62}$
C. $1^{131}$
D. $N a^{24}$

## Answer: A

## - Watch Video Solution

84. The proper rays for radio carbon dating are
A. UV rays
B. IR rays
C. Cosmic rays
D. X-rays

Answer: C

## (D) Watch Video Solution

85. The nuclear reaction
${ }_{29}^{63} \mathrm{Cu}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{17}^{37} \mathrm{Cl}+{ }_{1}^{1} \mathrm{H}+16{ }_{0}^{1} n$
is referred to as
A. Spallation reaction
B. Fusion reaction
C. Fission reaction
D. Chain reaction

## - Watch Video Solution

86. Unstable substance exhibity higher radioactivity due to
A. low $\mathrm{P} / \mathrm{N}$ ratio
B. high P/N ratio
C. $\mathrm{P} / \mathrm{N}=1$
D. Both (A) and (B)

Answer: D
87. The reactor used to convert stable form to fissile
form is
A. Chemical reactor
B. Nuclear reactor
C. Breeder reactor
D. Atomic reactor

## Answer: C

88. Which of the following are easily stopped by air ?
A. X-rays
B. UV -rays
C. $\gamma$-rays
D. $\alpha$-rays

## Answer: D

## D View Text Solution

89. $\beta$ - particle in radioactivity is emitted by:
A. conversion of proton to neutron
B. from outermost orbit
C. conversion of neutron to proton
D. beta-particle is not emitted

## Answer: C

## D Watch Video Solution

90. The phenomenon of radioactivity is associated with
a)Decay of nucleus b)Fussion of nucleus c)Emission of electrons or protons d)Rearragement in the in the extra nuclear electron
A. binary fission
B. nuclear fission
C. nuclear fusion
D. decay fo unstable nuclei

## Answer: D

## D Watch Video Solution

91. The first artifical disintegration of an atomic nucleus
was achieved by
A. Geiger
B. Wilson
C. Madame curie

D. Rutherford

Answer: D

## - View Text Solution

92. The radioisotope, tritium $\left({ }_{1}^{3} H\right)$ has a half-life of
12.3 years. If the initial amount of tritium is 32 mg , how many milligrams of it would remain after 49.2 years ?
A. 8 mg
B. 1 mg
C. 2 mg
D. 4 mg

## Answer: C

## - Watch Video Solution

93. The radioactive nuclide ${ }_{.90}^{234} T h$ shows two successive $\beta-$ decay followed by one $\alpha-$ decay. The atomic number and mass number respectively of the resulting atom is:
A. 92 and 234
B. 94 and 230
C. 90 and 230
D. 92 and 230

## Answer: C

## - Watch Video Solution

94. The half life of radioactive isotope is 3 hour. If the initial mass of isotope were 256 g , the mass of it remaining undecayed after 18 hr is a) 12 g b$) 16 \mathrm{~g} \mathrm{c}) 4 \mathrm{~g}$
d) 8 g
A. 4.0 g
B. 8.0 g
C. 12.0 g
D. 16.0 g

## Answer: A

## - Watch Video Solution

95. How may $\alpha-$ and $\beta-$ particles will be emitted when ${ }_{90} T h^{232}$ changes into $.82 P b^{208}$ ?
A. 8,6
B. 6,4
C. ,4,2
D. 2,2

Answer: B
96. $A \xrightarrow{-2 \beta} \xrightarrow{-\alpha} C$. Relation between A and C is
A. isotope
B. isotone
C. isodiapheres
D. isobar

Answer: A

- Watch Video Solution

97. It $t_{1 / 2}$ of $A$ is 1000 yrs , then ' A ' left after $\mathrm{t}=2000$ years
A. 0.5
B. 0.25
C. 0.125
D. 0.06725

Answer: B

- Watch Video Solution

98. If $N_{0}=1 \mathrm{gm}$ then after how many half lives Nt will be 0.25 gm ?
A. 2
B. 3
C. 1
D. 4

## Answer: A

## - Watch Video Solution

99. ${ }_{92}^{235} U+X \rightarrow B a+K r+3_{1}^{0} n \mathrm{X}$ is
A. ${ }_{0}^{1} n$
B. ${ }_{1}^{1} H$
C. ${ }_{-1} e^{0}$
D. $+1 e^{0}$

## Answer: A

## - Watch Video Solution

100. Alpha particles are
A. protons
B. charged helium atoms
C. positron

## D. electrons.

Answer: B

## D Watch Video Solution

101. Most radioactive is
A. U-238
B. Plutonium
C. Thorium
D. None
102. Which of the following isotopes of uranium is most radioactive?
A. U-226
B. U-248
C. U-238
D. U-235

Answer: D

- Watch Video Solution

103. In the nuclear reaction
${ }_{13} A l^{27}+{ }_{2} H e^{4} \rightarrow{ }_{14} X^{30}+{ }_{1} H^{1}, X$ is
A. Si
B. Al
C. Mg
D. $P$

Answer: A

- Watch Video Solution

104. The product obtained after positron emission
from ${ }_{31} G a^{68}$ is
A. ${ }_{30} G a^{68}$
B. ${ }_{30} Z n^{68}$
C. ${ }_{31} Z n^{69}$
D. ${ }_{31} G a^{69}$

Answer: B

- Watch Video Solution

105. One gm of an element decays by $\beta$-emission to
0.125 gm in 200 years. The half life period of the reaction is
A. 0.014 years
B. 6.66 years
C. 66.6 years
D. 666 years

Answer: C

- Watch Video Solution

106. Isotopes are
A. atoms of different elements having same mass
number
B.atoms of same element having same mass number
C. atoms of same element having different mass
numbers
D. atoms of different element having same number of neutrons.

Answer: C

- Watch Video Solution

107. The noble gas used in atomic reactors is
A. krypton
B. oxygen
C. neon
D. helium

Answer: D

- Watch Video Solution

108. The atomic number ( $A$ ) and mass number ( $M$ ) of the nuclide formed when three alpha ( $\alpha$ ) and 2 beta $(\beta)$ particles are emitted from ${ }_{92}^{238} U$ is
A. $A=87, M=233$
B. $A=86, M=226$
C. $A=88, M=235$
D. $A=88, M=226$

## Answer: D

109. The process, ${ }_{1} H^{2}+{ }_{1} H^{3} \rightarrow{ }_{2} H e^{4}+{ }_{0} n^{1}$
represents the types of reaction known as
A. fusion
B. chemical
C. autocatalytic
D. fission

Answer: A

- Watch Video Solution

110. Given that radioactive species decays according to
the exponential law $N=N_{0} e^{-\lambda t}$. The half life of the species is
A. $\lambda$
B. $N_{0}$
C. $\lambda / \ln / 2$
D. $\ln 2 / \lambda$

Answer: D

- Watch Video Solution

111. Fusion bomb involves
A. Combinations of lighter nuclei into bigger nucleus
B. Destruction of heavy nucleus into smaller nuclei
C. Combustion of oxygen
D. Explosion of TNT

## Answer: A

- Watch Video Solution

112. The element usef fro dating the ancient remains is
A. Ni
B. C-14
C. C-12
D. Rd.

## Answer: B

## - View Text Solution

113. If the mass defect of ${ }_{4}^{9} X$ is 0.099 a.m.u., then binding energy per nucelon is (1 a.m.u, 931.5 MeV )
A. 10.25 MeV
B. 931.5 MeV
C. 83.0 MeV
D. 8.38 MeV

## Answer: A

## D Watch Video Solution

114. ${ }_{27} \mathrm{Co}^{60}$ is radioactive because
A. its atomic number is high
B. it has high $\mathrm{p} / \mathrm{n}$ ratio
C. it has high $\mathrm{n} / \mathrm{p}$ ratio
D. None of these

## - Watch Video Solution

115. A heavy element has atomic number $X$ and mass number $Y$. Correct relation between $X$ and $Y$
A. $X>Y$
B. $X<Y$
C. $X=Y$
D. $X=Z(1-Y)$

Answer: B
116. Decay of ${ }_{92} U^{235}$ is .......order reaction.
A. Zero
B. Ist
C. 2nd
D. 3 rd

## Answer: B

## - Watch Video Solution

117. Order of radioactive disintegration reaction is
A. Zero
B. Ist
C. 2nd
D. 3 rd

## Answer: B

## - Watch Video Solution

118. In which radiation mass number and atomic number will not change?
A. $\alpha$
B. $\beta$
C. $\gamma$
D. $\alpha$ and $2 \beta$

## Answer: C

## - Watch Video Solution

119. The radioactive isotope ${ }_{27}^{60} \mathrm{Co}$ which is used in the treatment of cancer can be made by ( $\mathrm{n}, \mathrm{p}$ ) reaction. For this reaction the target nucleus is
A. ${ }_{27}^{60} \mathrm{Co}$
B. ${ }_{28}^{59} N i$
C. ${ }_{28}^{59} \mathrm{Co}$
D. ${ }_{28}^{60} N i$

Answer: D

## - Watch Video Solution

120. A radioactive isotope decays at such a rate that after 192 minutes only $1 / 16$ of the original amount remains. The half life of the radioactive isotope is
A. 32 min
B. 48 min
C. 12 min
D. 24 min

## - Watch Video Solution

121. An artifical radioactive isotope gave ${ }_{7}^{14} N$ after two successive $\beta$-particle emissions. The number of neutrons in the parent nucleus must be
A. 9
B. 14
C. 5
D. 7

## D Watch Video Solution

122. If radium and chlorine combine to form radium chloride the compound is
A. no longer radioactive
B. twice as radioactive as radium
C. half as radioactive as radium
D. as radioactive as radium

Answer: D

- Watch Video Solution

123. Consider the following nuclear reactions:
${ }_{92}{ }^{238} M \rightarrow \cdot{ }_{y}^{x} N+2 \cdot{ }_{2}^{4} \mathrm{He},{ }_{x}{ }^{y} N \rightarrow{ }_{B}{ }^{A} L+2 \beta^{+}$
The number of neutrons in the element $L$ is
A. 142
B. 146
C. 140
D. 144

Answer: C

- Watch Video Solution

124. The half life of a radio isotope is four hours. If the initial mass of the isotope was 200 g the mass remaining after 24 hours undecayed is
A. 1.042 g
B. 4.167 g
C. 3.125 g
D. 2.084 g

## Answer: C

## - View Text Solution

125. A radioactive isotope has half life of 8 days. If today 125 mg is left over, what was its original weight 32 days earlier?
A. 6 g
B. 5 g
C. 4 g
D. 2 g

Answer: D
126. Hydrogen bomb is based on the principle of
A. nuclear fusion
B. artifical radioactivity
C. nuclear fusion
D. natural radioactivtiy

## Answer: A

## D Watch Video Solution

127. A nuclide of an alkaine earth metal undergoes radioactive deacy by emission of the $\alpha-$ particles in
sucession. The group of the periodic tablle to which the resulting daughter element would belong to:
A. $\operatorname{Gr} 4$
B. Gr 6
C. Gr 16
D. Gr 14

## Answer: D

## - Watch Video Solution

128. . ${ }_{92} U^{238}$ emits $8 \alpha-$ particles and $6 \beta-$ particles.

The $n / p$ ratio in the product nucleus is a) $\frac{62}{41}$ b) $\frac{60}{41}$ c)
$\frac{61}{42}$ d) $\frac{62}{42}$
A. 60/41
B. $61 / 40$
C. $62 / 41$
D. $1 / 32$

Answer: C

## - Watch Video Solution

129. If a substance with hlaf life 3 days is taken at other
place in 12 days. What amount of substance is laft now
A. $1 / 4$
B. $1 / 8$
C. $1 / 16$
D. $1 / 32$

## Answer: C

## - Watch Video Solution

130. The half lives of two radioactive nuclides $A$ and $B$
are 1 and 2 min. respectively. Equal weights of $A$ and $B$ are taken separately and allowed to disintegrate for 4 min. What will be the ratio of weigths of $A$ and $B$ disintegrated ?
A. $1: 1$
B. 5: 4
C. 1:2
D. 1:3

## Answer: B

## - Watch Video Solution

131. Calculate the energy released in the following:
${ }_{\cdot 1} H^{2}+{ }_{.1} H^{3} \rightarrow{ }_{.2} H e^{4}+{ }_{0} n^{1}$
(Given
masses
$\left.H^{2}=2.014, H^{3}=3.016, H e=4.003, n=1.009 m_{u}\right)$
A. 16.76
B. 26.38
C. 13.26
D. 23.275

## Answer: D

## - Watch Video Solution

132. In successive emission of $\beta$ and $\alpha$-particles, how many $\alpha$ and $\beta$-particles should be emitted for the natural ( $4 \mathrm{n}+1$ series) conversion of ${ }_{94}^{241} \mathrm{Pu}$ to ${ }_{92}^{233} U$ are
A. $\alpha, \beta$
B. $\alpha, 2 \beta$
C. $2 \alpha, 3 \beta$
D. $2 \alpha, 2 \beta$

## Answer: D

## D Watch Video Solution

133. What will be the binding energy of ${ }^{16} O$, if the mass defect is 0.210 amu ?
A. $1.89 \times 10^{10} \mathrm{~J} \mathrm{~mol}^{-1}$
B. $1.89 \times 10^{15} \mathrm{~J} \mathrm{~mol}^{-1}$
C. $1.89 \times 10^{14} \mathrm{~J} \mathrm{~mol}^{-1}$
D. $1.89 \times 10^{13} \mathrm{~J} \mathrm{~mol}^{-1}$

Answer: D

## - Watch Video Solution

134. The compound used for the preparation of $U F_{6}$ in the enrichment of ${ }_{92} U^{235}$ is
A. $A l F_{3}$
B. $\mathrm{CaF}_{2}$
C. HF
D. $\mathrm{CIF}_{3}$

## Answer: D

## - Watch Video Solution

135. How many alpha and beta particles are emitted when uranium ${ }_{92}^{238} \mathrm{U}$ decays to lead ${ }_{82}^{206} \mathrm{~Pb}$ ?
A. $6 \alpha$ and $6 \beta$
B. $6 \alpha$ and $8 \beta$
C. $8 \beta$ and $8 \alpha$
D. $6 \beta$ and $8 \alpha$

Answer: D
136. Which emits $\beta$-particles ?
A. ${ }_{1} H^{3}$
B. ${ }_{6} C^{14}$
C. ${ }_{19} K^{40}$
D. All

## Answer: B

- Watch Video Solution

137. The neutron to proton ratio of the daughter element after a nucleides ${ }_{92} U^{238}$ loses an $\alpha$-particle and a beta particle successively is
A. 144/90
B. 143/91
C. 144/91
D. 132/91

Answer: B

## D Watch Video Solution

138. The nuclei ${ }_{6} C^{13} \&{ }_{.7} N^{14}$ can be described as
A. isotopes
B. isotone
C. isobars
D. isosteres

## Answer: B

- Watch Video Solution

Selected Straight Objected Type MCQs

1. Control rods used in nuclear reactor are made of

A. Iron

B. Graphite
C. Cadmium
D. Boron

## Answer: C::D

- View Text Solution

2. The moderator used in nuclear reactor is
A. $\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{D}_{2} \mathrm{O}$
C. Graphite
D. Boron

Answer: B::C

## D View Text Solution

3. In a nuclear reactor, heavy water is used to a)Increase the speed of neutorns b)Decreases the speed of neutrons c)Transfer the heat from the reactor d)None of above
A. transfer the that from the reactor
B. provide high speed neutrons for the fission

## reactor

C. reduce the speed of moving neutrons
D. increase the speed of neutrons

## Answer: A::C

## D Watch Video Solution

4. The fissionable material commonly used in atomic bomb is (are)
A. ${ }_{92} U^{235}$
B. ${ }_{2} T h^{238}$
C. ${ }_{94} U^{239}$
D. ${ }_{90} T h^{232}$

## Answer: A::C

## - View Text Solution

5. Nuclear fusion is the source of energy in
A. atomic bomb
B. hydrogen bomb
C. the sun
D. the moon

## Answer: B::C

## - View Text Solution

6. The nuclear reactions accompanied with emission of neutron ( $s$ ) are
A. ${ }_{13} A l^{27}+{ }_{2} H^{4} \rightarrow{ }_{15} P^{30}$
B. ${ }_{6} C^{12}+{ }_{1} H^{1} \rightarrow{ }_{7} N^{13}$
C. ${ }_{15} P^{30} \rightarrow{ }_{14} S i^{30} \rightarrow{ }_{14} S i^{30}+{ }_{1} e^{0}$
D. ${ }_{96} \mathrm{Cm}^{241}+{ }_{2} \mathrm{He}^{4} \rightarrow{ }_{97} B K^{244}+{ }_{1} e^{0}$

Answer: A::C
7. Decrease in atomic number is observed during a) $\alpha$ emission b) $\beta$-emission c)positron emission d)electron capture
A. $\alpha$-emission
B. $\beta$-emission
C. positron emission
D. electron capture

## Answer: A::C::D

- Watch Video Solution

8. Radium has atomic weight 226 and a half-life of 1600

Yr. The number of disintegrations produced per second
from one gram are
A. $4.28 \times 10^{11}$
B. $9.27 \times 10^{5}$
C. positron emission
D. $6.02 \times 10^{23}$

## Answer: D

- Watch Video Solution

9. The activity of radionuclide $\left({ }^{100} X\right)$ is 6.023 curie. If the disintegration constatnt is a) $3.7 \times 10^{4} \mathrm{sec}^{-1}$,the mass of radionuclide is b) $10^{-6} \mathrm{~g}$ c) $10^{-15} \mathrm{~g}$ d) $10^{-3} \mathrm{~g}$
A. $10^{-3} \mathrm{~g}$
B. $10^{-6} \mathrm{~g}$
C. $10^{-14} 14 \mathrm{~g}$
D. $10^{-15} \mathrm{~g}$

## Answer: D

10. The half life of a radioactive substance is 24 hours.

Time required for $12.5 \%$ of the original radioactive substance $W$ remain is
A. 1 day
B. 2 days
C. 3 days
D. 4 days

## Answer: C

- Watch Video Solution

11. ${ }_{91} P a^{234}$ an element of group 3 emits $\beta$-particles, the daughter nuclide belongs to
A. group 2
B. group 4
C. group 1
D. group 3

Answer: D

- Watch Video Solution

12. The mass of an atom of ${ }_{2} H e^{4}$ is 4.0026 amu . The mass of a neutron and a proton are 1.0087 amu and 1.0078 amu respectively. The nuclear binding energy per nucleon is nearly
A. 7 MeV
B. 5 MeV
C. 10 MeV
D. 14 MeV

Answer: A
13. (92) ${ }^{233} U$ is assumed to decay by emitting $\alpha$ - and $\beta$ particles, the possible produce of decay is
A. ${ }_{82}^{207} \mathrm{~Pb}$
B. ${ }_{82}^{205} \mathrm{~Pb}$
C. ${ }_{82}^{206} \mathrm{~Pb}$
D. ${ }_{82}^{208} \mathrm{~Pb}$

## Answer: C

## - View Text Solution

14. ${ }_{92}^{238} U$ emits an $\alpha$-particle, the product has the atomic and mass numbers as
A. 92,236
B. 90,234
C. 90,238
D. 96,236

## Answer: B

## - Watch Video Solution

15. The radiation from naturally occuring radioactive substance as seen after deflection by a magnetic field in one direction are :
A. Definitely alpha rays
B. Definitely beta rays
C. Both alpha and beta rays
D. Either $\alpha$-or $\beta$ rays

## Answer: D

## (D) Watch Video Solution

16. An isotone of ${ }_{32}^{76} G e$ is-
(a). ${ }_{32}^{77} G e$
(b). ${ }_{33}^{77} A s$
(c). ${ }_{34}^{77} S e$
(d). ${ }_{34}^{78} S e$
A. ${ }_{32}^{77} G e$
B. ${ }_{32}^{77} A s$
C. ${ }_{34} \mathrm{Se}$
D. ${ }_{36}^{78} S c$

## Answer: B

## - Watch Video Solution

17. The half - life periof of a radioactive element is 140
days. After 560 days, one gram of the element will reduce to
A. $1 / 2 \mathrm{~g}$
B. $1 / 4 \mathrm{~g}$
C. $1 / 8 \mathrm{~g}$
D. $1 / 16 \mathrm{~g}$

## Answer: D

## D Watch Video Solution

18. The triad of nuclei that is isotonic is
A. ${ }_{6} C^{14},{ }_{7} N^{14},{ }_{9} F^{17}$
B. ${ }_{6} C^{14},{ }_{7} N^{14},{ }_{9} F^{17}$
C. ${ }_{6} C^{14},{ }_{7} N^{14},{ }_{9} F^{17}$
D. ${ }_{6} C^{14},{ }_{7} N^{14},{ }_{9} F^{17}$

## Answer: A

## - Watch Video Solution

19. . ${ }_{7} N^{13}$ changes to ${ }_{6} C^{13}$ by the emission of
A. Electron
B. Neutron
C. Positron
D. Proton

## Answer: C

20. The nucleus resulting from ${ }_{92} U^{238}$ after successive emission of two $\alpha$ and four $\beta$-particles is
A. ${ }_{90} T h^{230}$
B. ${ }_{94} P u^{230}$
C. ${ }_{88} R a^{230}$
D. ${ }_{92} U^{230}$

Answer: D

- Watch Video Solution

21. $1 g$ atom of an $\alpha$-emitting $\cdot z X^{4}$ (half life $=10 \mathrm{hr}$ ) was placed in sealed containers, $4.52 \times 10^{25}$. Helium atoms will accumulate in the container after a) 4.52 hr b) 10.00 hr c) 9.40 hr d )20.00 hr
A. 4.52 hrs
B. 9.40 hrs
C. 10.00 hrs
D. 20.00 hrs

Answer: D
22. An element $X$ loses one $\alpha$ - and two $\beta-$ particles in three successive stages. The resulting element will be
A. an isobar of $X$
B. an isotope of $X$
C. X itself
D. an isotone of $X$

Answer: B

- Watch Video Solution

23. ${ }_{13} A l^{27}$ is a stable isotope. ${ }_{13} A l^{29}$ is expected to disintegrate by
A. $\alpha$-emission
B. $\beta$-emission
C. positron emission
D. Proton emission

Answer: B

- Watch Video Solution

24. Loss of $\beta$-particles is equivalent to
A. Increase of one proton only
B. Decrease of one neutron only
C. Both (a) and(b)
D. None of these

## Answer: C

## - Watch Video Solution

25. The number of neutrons accompanying the formation of ${ }_{\cdot 54} X e^{139}$ and ${ }_{.38} S r^{94}$ from the absorption of a slow neutron by ${ }^{92} U^{235}$, followed by nuclear fission is
A. 0
B. 2
C. 1
D. 3

## Answer: D

## - Watch Video Solution

26. . ${ }^{23} \mathrm{Na}$ is the more stable isotope of Na . Find out the process by which.$_{11}^{24} \mathrm{Na}$ can undergo radioactive decay.
A. $\beta$-emission
B. $\alpha$-emission
C. $\beta^{+}$-emission
D. K-electron capture

Answer: A

## - Watch Video Solution

## Linked Comprehension Type MCQs

1. The half life can serve as the molecular clock to determine the age of different products i.e., mineral, rocks and matter of vegetable origin such as wood, charcoal etc. because the half-life of a particlar nucleide
is constant. C-14 being radio-isotope, it is also used to determine the age of different products. which is known as radio-carbon dating.
$\mathrm{C}-14$ is a neutron rich nucleide that decays by $\beta$ emission with a half-life of 5730 years as under :
${ }_{6}^{14} C \rightarrow{ }_{7}^{14} N+{ }_{-1}^{0} e$
Just after World War II . Willcard F. Libby proposed a way to use this rection to determine the age of the carbon containing substances. The C-14 dating technique for which Libby received nobel is based upon the following assumption .
(i) C-14 is produced in atmosphere at a more or less constant rate which is also equal to its rate of decay. As a result, there is a constant concentration of C-14 in the atmosphere and all living things.
(ii) After death, organisms no longer pick C-14
(iii) By comparing activity of a sample with acitivity of living tissue we can estimate the age of organisms. One of the Libby's assumptions is questionable, the amount of C-14 has not been constant with time. It has varied as much as $\pm 5 \%$.

The activity of the C-14 in given tissue is 15.3 dpm per gram of carbon. The limit for the reliable determination of C-14 is 0.1 dpm per gram of carbon. The maximum age of the sample, that can be dated accurately, is
A. 41600 years
B. 42700 years
C. 21600 years
D. 20500 years

## Answer: A

## - View Text Solution

2. The half life can serve as the molecular clock to determine the age of different products i.e., mineral, rocks and matter of vegetable origin such as wood, charcoal etc. because the half-life of a particlar nucleide is constant. C-14 being radio-isotope, it is also used to determine the age of different products. which is known as radio-carbon dating.
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(i) C-14 is produced in atmosphere at a more or less constant rate which is also equal to its rate of decay. As
a result, there is a constant concentration of C-14 in the atmosphere and all living things.
(ii) After death, organisms no longer pick C-14
(iii) By comparing activity of a sample with acitivity of living tissue we can estimate the age of organisms.

One of the Libby's assumptions is questionable, the
amount of C-14 has not been constant with time. It has
varied as much as $\pm 5 \%$.

It activity of C-14 in living matter is 15.3 dpm , then what will be the age of the object which has activity of 4 d.p.m. ?
A. 11100 years
B. 22200 years
C. $5.1 \times 10^{5}$ years
D. $2.1 \times 10^{6}$ years

## Answer: A

3. The half life can serve as the molecular clock to determine the age of different products i.e., mineral, rocks and matter of vegetable origin such as wood, charcoal etc. because the half-life of a particlar nucleide
is constant. C-14 being radio-isotope, it is also used to
determine the age of different products. which is known as radio-carbon dating.
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(i) C-14 is produced in atmosphere at a more or less constant rate which is also equal to its rate of decay. As
a result, there is a constant concentration of $\mathrm{C}-14$ in the atmosphere and all living things.
(ii) After death, organisms no longer pick C-14
(iii) By comparing activity of a sample with acitivity of living tissue we can estimate the age of organisms . One of the Libby's assumptions is questionable, the amount of C-14 has not been constant with time. It has varied as much as $\pm 5 \%$.

Charcoal sample emits $62.3 \%$ of disintegrations per gram of carbon per minute for living tissue. Then, what will be the age of charcoal ?
A. 4910 years
B. 3910 years
C. 6000 years
D. 5050 years

## Answer: B

## D View Text Solution

4. The half life can serve as the molecular clock to determine the age of different products i.e., mineral, rocks and matter of vegetable origin such as wood, charcoal etc. because the half-life of a particlar nucleide is constant. C-14 being radio-isotope, it is also used to determine the age of different products. which is
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living tissue we can estimate the age of organisms .

One of the Libby's assumptions is questionable, the amount of C-14 has not been constant with time. It has varied as much as $\pm 5 \%$.

What will be the weight ratio of living tissue to dead tissue for the age of 22920 years , if it is dated by radiocarbon technique?
A. $16: 1$
B. $8: 1$
C. 10: 3
D. 5:7

Answer: A
5. The phenomenon of spontaneous nuclear disintegration of radioactive elemets. Isotopes by emitting $\alpha, \beta$ or $\gamma$-rays in order to give stable nucleus is known as radioactivity. It is totally a nuclear phenomenon i.e., only depends upon the nucleons. It is alos known as activity and is given by
$A=\lambda N$
where $\lambda=$ decay constant
$\mathrm{N}=\mathrm{no}$. of atoms at time t

Activity per gram of the sample is known as specific activity. The cause of radioactivtiy of a nucleide can be attributed to a certain degree to its neutron to proton
ratio i.e., $\mathrm{n} / \mathrm{p}$ ratio. Lighter nucleides with $\mathrm{n} / \mathrm{p}=1$ or
slightly greater than one, are non-radioactive or stable nucleides. Nucleides with $Z>20$, requires large number of neutrons than protons to moderate the effect of the increasing protonic repulsions. Nucleides
with $Z>83$, the protonic repulsions are too large to
overcome by proton -neutron interactions. The stable
nuclei lie within zone of stability, all the nuclei which
fall outside of this zone are invariably radioactive and
unstable in nature. Nuclei which are above the stability
zone have excess protons. These nuclei attain stability
by making adjustments in $n / p$ ratio for moderate value.
Which of the following statement is correct ?
A. The radioactivity of $R a C l_{2}$ and Ra will be same
B. The radioactivity of $R a C l_{2}$ and Ra will not be

## samw

C. The radioactivity depends on the chemical reaction
D. All

## Answer: A

## D View Text Solution

6. The phenomenon of spontaneous nuclear disintegration of radioactive elemets. Isotopes by emitting $\alpha, \beta$ or $\gamma$-rays in order to give stable nucleus
is known as radioactivity. It is totally a nuclear phenomenon i.e., only depends upon the nucleons . It is alos known as activity and is given by

$$
A=\lambda N
$$

where $\lambda=$ decay constant
$N=n o$ of atoms at time $t$
Activity per gram of the sample is known as specific
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fall outside of this zone are invariably radioactive and unstable in nature. Nuclei which are above the stability
zone have excess protons. These nuclei attain stability by making adjustments in $n / p$ ratio for moderate value.

Which of the following statement(s) is (are) correct ?
A. Radioactivity only depends upon the nucleons
B. Radioactivity is independent of pressure and temperature
C. Radioactivity is directly proportional to the no. of atoms of the radioactive element, and reciprocal to the half-life of the radioactive elements

## D. All of these

## Answer: D

## - View Text Solution

7. The phenomenon of spontaneous nuclear disintegration of radioactive elemets. Isotopes by emitting $\alpha, \beta$ or $\gamma$-rays in order to give stable nucleus is known as radioactivity. It is totally a nuclear phenomenon i.e., only depends upon the nucleons. It is alos known as activity and is given by
$A=\lambda N$
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fall outside of this zone are invariably radioactive and unstable in nature. Nuclei which are above the stability
zone have excess protons. These nuclei attain stability
by making adjustments in $n / p$ ratio for moderate value.

## Choose the correct statement(s)

A. The activity of the same radioactive element for 5

## cc and 10 cc volume will be same

B. Specific activity of same radioactive element for

10 g and 1000 g sample will be same
C. Specific activity of same radioactive element for

10 g and 100 g sample will not be same
D. Specific activity for 10 g of each fo different nucleides will be same.

Answer: B
8. The phenomenon of spontaneous nuclear disintegration of radioactive elemets. Isotopes by emitting $\alpha, \beta$ or $\gamma$-rays in order to give stable nucleus is known as radioactivity. It is totally a nuclear phenomenon i.e., only depends upon the nucleons. It is alos known as activity and is given by
$A=\lambda N$
where $\lambda=$ decay constant
$\mathrm{N}=$ no. of atoms at time t

Activity per gram of the sample is known as specific activity. The cause of radioactivtiy of a nucleide can be attributed to a certain degree to its neutron to proton ratio i.e., $\mathrm{n} / \mathrm{p}$ ratio. Lighter nucleides with $\mathrm{n} / \mathrm{p}=1$ or
slightly greater than one, are non-radioactive or stable nucleides. Nucleides with $Z>20$, requires large number of neutrons than protons to moderate the effect of the increasing protonic repulsions. Nucleides
with $Z>83$, the protonic repulsions are too large to
overcome by proton -neutron interactions. The stable
nuclei lie within zone of stability, all the nuclei which
fall outside of this zone are invariably radioactive and
unstable in nature. Nuclei which are above the stability
zone have excess protons. These nuclei attain stability
by making adjustments in $n / p$ ratio for moderate value.
Nucleide with high $n / p$ ratio which are above the zone of stability , can stability cannot be achieved by
A. $\beta$-emission
B. K-electron capture
C. positron emission
D. $\alpha$-emission

## Answer: A

## - View Text Solution

9. The phenomenon of spontaneous nuclear disintegration of radioactive elemets. Isotopes by emitting $\alpha, \beta$ or $\gamma$-rays in order to give stable nucleus is known as radioactivity. It is totally a nuclear phenomenon i.e., only depends upon the nucleons. It is alos known as activity and is given by
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nuclei lie within zone of stability, all the nuclei which
fall outside of this zone are invariably radioactive and
unstable in nature. Nuclei which are above the stability
zone have excess protons. These nuclei attain stability by making adjustments in $n / p$ ratio for moderate value.

Nucleide with low $\mathrm{n} / \mathrm{p}$ ratio, which are below the zone of stability , the stability cannot be achieved by
A. $\beta$-emission
B. K-electron capture
C. positron emission
D. emission of $\alpha$-particles.

## Answer: A

## D View Text Solution

1. Assertion : To separate $\mathrm{U}-235$ from the more abundant U-238 isotope, all the uranium is converted into $U F_{6}$

Reason : $U F_{6}$ is one of the new compounds that exists in gaseous state under ordinary conditions
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both A and R are true but R is not a correct
explanation of A
C. $A$ is true but $R$ is false

## D. A is false but $R$ is true

Answer: A

## - View Text Solution

2. Assertion : Activity of $10^{8}$ undecayed radioactive nucei of half life 50 days is equal to that of $10 \times 10^{8}$ number of undecayed nuclei of some other material with half life 60 days.

Reason : Activity is proportional to half life
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: A

## - View Text Solution

3. Assertion $(A)$ : In radioactive disintegrations, . ${ }_{2} H e^{4}$
nuclei can come out of the nucleus but lighter ${ }_{.2} H^{3}$
cannot.
Reason $(R)$ : The binding energy of ${ }_{.2} H^{3}$ is more than that of ${ }_{.2} H^{4}$.
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: B

## - Watch Video Solution

4. Assertion : In a fission reaction a heavy nucleus is
broken into three fragement of nearly equal mass .

Reason: The binding energy per nucleon for a heavy nuclei is less than the binding energy per nucleon of the fragments.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. Both $A$ and $R$ are false

## Answer: D

## - View Text Solution

5. Assertion : Neutrons are better projectiles.

Reason : Neutrons move faster than protons or alpha particles.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: C

6. Assertion : Heavy water acts as a moderator in nuclear reactors.

Reason : Heavy water absorbs fast moving electrons.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of $A$
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of $A$
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true
7. Assertion $(A): \gamma-$ rays have very high penetrating power.

Reason $(R): \gamma-$ rays are high $-\quad$ energy electromagnetic radiations. a)If both $(A)$ and $(R)$ are correct , and $(R)$ is the correct explanation of $(A)$ b)If both $(A)$ and $(R)$ are correct, but (R) is not the correct explanation of $(A)$ c)If $(A)$ is correct, but $(R)$ is incorrect. d )If $(A)$ is incorrect, but $(R)$ is correct.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: A

## - Watch Video Solution

8. Assertion : Neutrons are better prohectiles than protons or $\alpha$-particles.

Reason : The neutrons being neutral does not experience repulsions form positively charged nucleus.
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: A

## D View Text Solution

9. Assertion $(A)$ : Nucleus of the atom does not contain electrons, yet it emits $\beta$ - particles in the form
of electrons.
Reason $(R)$ : In the nucleus, protons and neutrons exchange mesons frequently. a)If both $(A)$ and ( $R$ ) are correct, and $(R)$ is the correct explanation of $(A)$ b)If both $(A)$ and $(R)$ are correct, but (R) is not the correct explanation of $(A)$ c)If $(A)$ is correct, but $(R)$ is incorrect. d)If $(A)$ is incorrect, but $(R)$ is correct.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: B

## - Watch Video Solution

10. Assertion : Thorium, uranium and actinium series
are designated as $4 n, 4 n+2$ and $4 n+3$ series respectively.

Reason : The mass number of all elements in the thorium series are divided by 4 gives a remainder of 2 while those of actinium series gives a remainder of 3 when the mass number is divided by 4.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: A

## - View Text Solution

11. Assertion : The fourth series $(4 n+1)$ starts with plutonium -241 and ends with bismuth -209 is known as

Neptunium series.
Reason : Neptunium is a naturally occuring element
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. $A$ is false but $R$ is true

## Answer: C

## D View Text Solution

12. Assertion : $4 \mathrm{n}+1$ series is designated as Neptunium series.

Reason : The fourth series is not naturally occuring and
Neptunium -237 is the longest -lived member of the series.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: A

13. Assertion : $\beta$-particles are very effective projectile for transformation.

Reason : $\beta$-particles are negatively charged particles having very small mass and hence very small momentum
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: D

## - View Text Solution

14. Assertion : $\alpha$-particles are generally used as projectiles for transformation

Reason : $\alpha$-particles always experience repulsion from the positively charged nucleus.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but R is true

## Answer: D

## - View Text Solution

15. Assertion : At least one radioactive isotope of every
element has been prepared in the laboratory.
Reason : The bombardment of various atomic nuclei
with common light weight projectile lead to artificial radioactivity.
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: A

## D View Text Solution

16. Assertion : The elements with atomic numbers greater than 92 (transuranic elements) are known as
synthetic elements.
Reason : Transuranic elements are rarely formed in the earth's crust but have been produced in the laboratory.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but R is true

## Answer: A

17. Assertion : Plutonium among the transuranic elements is the longest lived element.

Reason : Plutonium is not radioactive.
A. Both $A$ and $R$ are true and $R$ is the correct explanation of A
B. Both $A$ and $R$ are true but $R$ is not a correct explanation of A
C. $A$ is true but $R$ is false
D. A is false but $R$ is true

## Answer: C

## Ultimate Preparatory Package

1. ${ }_{92}^{238} U$ under $\alpha$-decay . The daughter nuclide belongs to group
A. 5
B. 1
C. 3
D. 2

Answer: D

- Watch Video Solution

2. ${ }_{92}^{237} U$ undergoes $\beta$-decay . The daughter nuclide belong to group
A. 3
B. 4
C. 2
D. None of these

Answer: A

- Watch Video Solution

3. Consider the following disintegration reactions
${ }_{91} P^{234} \xrightarrow{-\beta}{ }_{92} U^{234} \xrightarrow{-\alpha}{ }_{90} T h^{230} \xrightarrow{-\alpha}{ }_{88} R a^{236} \quad$ Ra
belongs to Groups 2 of the long form of the periodic table. To which group nuclide Pa-91 belongs ?
A. 5
B. 4
C. 3
D. 2

Answer: C

## - View Text Solution

4. Packing fraction for which of the following nuclide is
zero ?
A. ${ }_{1} H^{1}$
B. ${ }_{1} H^{2}$
C. ${ }_{26} H^{56}$
D. $6 H^{12}$

## Answer: D

## - View Text Solution

## 5. Radioactive Equilibrium

A. the rate of fission becomes equal to rate of fusion at equilibrium
B. the concentrations of various nuclide involved becomes constant at equilibrium
C. both A and B
D. None

## Answer: D

## - Watch Video Solution

6. An unstable nuclide with $N / P$ ratio more than that required for stability can attain stability by
A. $\alpha$-decay
B. $\beta^{-}$decay
C. K-electron capture
D. Both A and C

Answer: B

## - Watch Video Solution

7. An unstable nuclide $(Z<70)$ with $\mathrm{N} / \mathrm{P}$ ratio less than that required for stability can attain stability by
A. $\alpha$-decay
B. $\beta^{-}$decay

## C. K-electron capture

D. Both A and C

## Answer: A

## - Watch Video Solution

8. An unstable nuclide $(Z<70)$ with $\mathrm{N} / \mathrm{P}$ ratio less than that required for stability can attain stability by
A. $\alpha$-decay
B. $\beta^{-}$decay
C. K-electron capture
D. All the three

## Answer: D

## - Watch Video Solution

9. Which of the following has the highest value for its
radioactivity ?
A. 1 g of Ra
B. 1 g of $\mathrm{RaCl}_{2}$
C. 1 g of $R a_{3}\left(\mathrm{PO}_{4}\right)_{2}$
D. 1 g of $\mathrm{RaNO}_{3}$

Answer: A
10. Maximum number of stable nuclides are when
A. $P$ is even and $N$ is odd
B. $P$ is even and $N$ is even
C. $P$ is odd and $N$ is even
D. $P$ is odd and $N$ is odd

## Answer: B

## - Watch Video Solution

11. Pick out the odd one out
A. Cyclotron
B. Wilson cloud chamber
C. Spinthariscope
D. Geiger -Muller counter

## Answer: A

## - View Text Solution

12. Pick out the odd one out
A. Cyclotron
B. Linear particle accelerator
C. Cathode ray oscilloscope (CRO)

## D. Synchroton

## Answer: C

## - View Text Solution

13. Pick out the incorrect statement
A. Energy released per gram is more is case of
fusion than in fission
B. Energy released per mole is more in case of fusion than in fission
C. Energy released per gram is more in case of

# D. Energy released per mole is less in case of fission 

 than in fusion.Answer: A

## - View Text Solution

## Brain Teasers-7

1. How many electrons flow when a current of 5 amperes is passed through a conductor for 200 seconds?
A. $6.02 \times 10^{23}$
B. $6.24 \times 10^{21}$
C. $6.024 \times 10^{21}$
D. $6.2 \times 10^{22}$

## Answer: B

## D Watch Video Solution

2. Which of the following can act as an oxidising and reducing agent in neutral and alkaline solution ?
A. $\mathrm{K}_{2} \mathrm{Cr}_{2} \mathrm{O}_{7}$
B. $\mathrm{KMnO}_{4}$
C. $C l_{2}$
D. $\mathrm{CrO}_{3}$

Answer: B

## - View Text Solution

3. Which of the following reactions involves neither oxidation nor reduction?
A. $\mathrm{CrO}_{4}^{2-} \rightarrow \mathrm{Cr}_{2} \mathrm{O}_{7}^{2-}$
B. $\mathrm{Cr} \rightarrow \mathrm{CrCl}_{3}$
C. $N a \rightarrow N a^{+}$
D. $2 \mathrm{~S}_{2} \mathrm{O}_{3}^{2-} \rightarrow \mathrm{S}_{4} \mathrm{O}_{6}^{2-}$

## Answer: A

## D Watch Video Solution

4. What would happen when a small quantity of $\mathrm{H}_{2} \mathrm{O}_{2}$ is added to a solution of $\mathrm{FeSO}_{4}$ ?
A. Colour disappears
B. $H_{2}$ is evolved
C. An electron is added to $\mathrm{Fe}^{2+}$
D. An electron is lost by $F e^{2+}$

Answer: D
5. The buring of hydrogen is called as
A. Hydrogenation
B. Hydration
C. Oxidation
D. Reduction

## Answer: C

## - View Text Solution

6. The elements with even atomic numbers are
A. less stable
B. more stable
C. may or may not be stable
D. none

## Answer: B

## - Watch Video Solution

7. The numbers $2,8,20,28,50,82,126$ are called as
A. even Numbers
B. integers
C. bohr Numbers
D. magic Number

Answer: D

## - Watch Video Solution

8. How may $\alpha-$ and $\beta$ - particles will be emitted when ${ }_{90} T h^{232}$ changes into $.82 \mathrm{~Pb}^{208}$ ?
A. 2,2
B. 4,2
C. 6,4
D. 8,6

## Answer: C

## - Watch Video Solution

9. Successive emission of an $\alpha$-particle and two $\beta$ particles by an atom of an element result in the formation of its
A. isobar
B. isotone
C. isotope
D. isotherm

## - Watch Video Solution

10. The largest stable nucleus is
A. $\mathrm{U}-238$
B. U-235
C. Pb-206
D. $\mathrm{Bi}-209$

Answer: C

- View Text Solution

11. When a radioactive substances is subjected to a vacuum, the rate of disintergration per second
A. increase considerably
B. increases only if the products are gaseous
C. is not affected
D. suffer a slight decrease

## Answer: C

- Watch Video Solution

12. The radioactivity due to $C-14$ isotope (half-life $=$ 6000 years) of a sample of wood form an ancient tomb was found to be nearly half that of fresh wood. The bomb is there for about how many years old? a)3000
b) 6000 c) 9000 d$) 12000$
A. 3000 years old
B. 6000 years old
C. 9000 years old
D. 12000 years old

## Answer: B

13. Tritium undergose radioactive decay giving
A. $\alpha$-particle
B. $\beta$-particle
C. neutrons
D. None of these

## Answer: B

- Watch Video Solution

14. How many hour are required for a current of 3.0 ampere to decompose $18 g$ water?
A. 6 h
B. 12 h
C. 18 h
D. 24 h

Answer: B

## - Watch Video Solution

15. The nuclear reaction given below is of ...... type
${ }_{13}^{27} \mathrm{Al}+{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{14}^{30} \mathrm{Si}+{ }_{1}^{1} H$
A. fusion
B. fission
C. transmutation
D. chemical

## Answer: C

## - Watch Video Solution

16. A sample of radioactive element with $t_{0.5}$ of 11.2 yr weigh 2.0 g . After 33.6 yrs how much is left ?
A. 0.25 g
B. 0.5 g
C. 0.75 g
D. 1.0 g

## - Watch Video Solution

17. The $t_{0.5}$ of a radioactive element is related to its average life by the expression
A. $1.44 / t_{0.5}$
B. $0.693 t_{0.5}$
C. $t_{0.5} / 1.44$
D. $1.44 t_{0.5}$

Answer: D
18. Which one is an example of miceller system?
A. Soap + water
B. Protein + water
C. Rubber + benzene
D. None

Answer: A
19. Which of the following is the best protective colloid?
A. Gelatin ( gold no.=0.005)
B. Gum arabic (gold no. $=0.15)^{`}$
C. Egg albumin (gold no. $=0.08$ )
D. None

Answer: A

- Watch Video Solution

20. The coagulation of 100 ml of colloidal solution of gold is completely prevented by addition of 0.25 g of a substance "X" to it before addition of 1 ml of $10 \% \mathrm{NaCl}$ solution. The gold number of " X "is :
A. 0.25
B. 25
C. 250
D. 2.5

## Answer: B

21. $A$ isoelectric point

# A. Colloidal particles become uncharged 

B. Colloidal sol becomes highly stable
C. Peptization can be carried out
D. None

## Answer: A

## - View Text Solution

22. Gold number was given by :
A. Ostwald
B. Zsigmondy
C. Williams ad Chang
D. None

## Answer: B

## D Watch Video Solution

23. The accumulation of gases on surface of solids is
called as
A. Absorbtion
B. Adsorption
C. Occlusion
D. None

Answer: C

## - View Text Solution

24. In the Leclanche dry cell, anode is
A. Graphite rod
B. Carbon
C. Zinc container
D. $\mathrm{MnO}+$ carbon
25. If the specific conductance and conductance of a solution are same, then its cell constant is equal to:
A. 1
B. 0
C. 1000
D. 10

Answer: A

- Watch Video Solution

26. Which of the following solutions will have the highest specific conductance?

A. 0.001 N

B. 0.0001 N
C. 0.1 N
D. 1.0 N

## Answer: D

## - View Text Solution

27. The term quinhydrone means
A. a quinone
B. a hydroquinone
C. a mixture of quinone and hydroquinone
D. none of above

## Answer: C

## - View Text Solution

28. The standard electrode potential of the electrode
$\mathrm{Ag}(\mathrm{s}), \mathrm{AgCl} \mid \mathrm{KCl}(1 \mathrm{M})$ is
A. +0.2225 V
B. +0.2245 V
C. +0.2255 V
D. 0.2265 V

Answer: A

## - View Text Solution

29. The calomel electrode is reversible with repect to :
A. mercury
B. $H^{+}$
C. $H g^{2+}$
D. $\mathrm{Cl}^{-}$

## Answer: D

## - Watch Video Solution

30. In potentiometric titrations, the end point of a titration is determined
A. with the help of an indicator
B. by measuring potential of an electrode
C. by measuring conductance
D. by measuring density

Answer: B

## 31. In a concentration cell the

A. two electrodes are of different elements
B. two electrolytic solutions of the same electrolyte
but having different concentrations are used
C. electrolyte of one strength but elecrtrodes of
two different concentrations are used
D. Both (B) and (C)

## Answer: D

32. The electrode potential of a glass electrode depends upon
A. concentration of chlorine ions
B. concentration of hydrogen ions
C. concentration of KCl solution
D. None of these

## Answer: B

## - View Text Solution

33. Lithium is generally used as an electrode in high
energy density batteries. This is because
A. lithium is the hightest element
B. lithium has quite high negative reduction potential
C. lithium is quite reactive
D. lithium does not corrode easily

## Answer: B

## - View Text Solution

34. How long will it take for a current of 3 amperes to decompose 36 g of water? (Eq. wt. of hydrogen is 1 and that of oxygen is 8)
A. 36 hours approx.
B. 18 hours approx
C. 9 hours approx.
D. 4.5 hours approx.

## Answer: A

## - Watch Video Solution

35. $\wedge=\wedge^{0}-b \sqrt{c}$ is called as
A. Faraday's Equation
B. Debye-Huckel-Onsagar's Equation
C. Henderson's Equation
D. None

Answer: B

## - View Text Solution

36. Calculate equivalent conductivity of $1 \mathrm{MH}_{2} \mathrm{SO}^{4}$ whose conductivity is $26 \times 10^{-2} \mathrm{ohm}^{-1} \mathrm{~cm}^{-1}$
A. 260
B. 130
C. 65
D. 200

## Answer: B

## - View Text Solution

37. At $18^{\circ} \mathrm{C}$, the conductivities at infinite dilution of
$\mathrm{NH}_{4} \mathrm{Cl}, \mathrm{NaOH}$ and NaCl are 129.8, 217.4 and 108.9
mho respectively. If the equivalent conductivity of
$\mathrm{N} / 100$ solution of $\mathrm{NH}_{4} \mathrm{OH}$ is 9.93 mho, calculate the degree of dissociation of $\mathrm{NH}_{4} \mathrm{OH}$ at this dilution.
A. 0.392
B. 39.2
C. 3.92
D. 0.039

## Answer: C

## - Watch Video Solution

38. KCl cannot be used as a salt bridge for cell $\mathrm{Cu}(\mathrm{s})$ |
$\mathrm{CuSO}_{4}(\mathrm{aq})| | \mathrm{AgNO}_{3}(\mathrm{aq}) \mid \mathrm{Ag}(\mathrm{s})$ because
A. $\mathrm{CuCl}_{2}$ gets precipited
B. $C l_{2}$ gas is evolved
C. AgCl gest precipitated
D. None of the above

Answer: A

## Brain Teasers-8

1. Oxidation number of carbon in carbon suboxide
$\left(C_{3} O_{2}\right)$ is :
A. $\frac{+2}{3}$
B. $\frac{+4}{3}$
C. +4
D. $\frac{-4}{3}$

Answer: B
2. Which of the following change represents a disproportionation reaction (s):
A. $\mathrm{Cl}_{2}+2 \mathrm{OH}^{-} \rightarrow \mathrm{ClO}^{-}+\mathrm{Cl}^{-}+\mathrm{H}_{2} \mathrm{O}$
B. $\mathrm{Cu}_{2} \mathrm{O}+2 \mathrm{H}^{+} \rightarrow \mathrm{Cu}+\mathrm{Cu}^{+2}+\mathrm{H}_{2} \mathrm{O}$
C.

$$
2 \mathrm{HCuCl}_{2} \xrightarrow[\text { water }]{\text { dilution with }} \mathrm{Cu}+\mathrm{Cu}^{+2}+4 \mathrm{Cl}^{-}+2 \mathrm{H}^{+}
$$

D. All the above

## Answer: D

3. The number of electrons per second which pass through a cross section of a copper wire carrying $10^{-16} \mathrm{~A}$ is
A. $1.6 \times 10^{-3} \mathrm{e} / \mathrm{s}$
B. $60 \mathrm{e} / \mathrm{s}$
C. $625 \mathrm{e} / \mathrm{s}$
D. $16 \times 10^{-2} \mathrm{e} / \mathrm{s}$

Answer: C

- View Text Solution

4. Blocks of magnesium metal are often strapped to the steel hulls of ocean going ships in order to:
A. provide catholic protection
B. prevent oxidation of the steel
C. Both A and B are correct
D. None of the $A$ and $B$ are correct

## Answer: C

- Watch Video Solution

5. To what stable isotope ${ }_{103}^{257} L w$ decay after having been produced by artificial means ?
A. ${ }_{83}^{209} B i$
B. ${ }_{82}^{208} \mathrm{~Pb}$
C. ${ }_{82}^{206} \mathrm{~Pb}$
D. ${ }_{82}^{207} \mathrm{~Pb}$

## Answer: A

## - View Text Solution

6. Sedimentation potential is reverse of :
A. Electro-osmosis
B. Electrophoresis
C. Electro kinetic potential
D. Dorn potential

## Answer: B

## - Watch Video Solution

7. Electro-osmosis was discovered by
A. Dorn
B. Reuss and Porret
C. Freundlich

## D. Langmuir

## Answer: B

## - View Text Solution

8. 50 ml of 1 M oxalic acid is shaken with 0.5 g of wood charcoal. The final concentration of the solution after adsorption is 0.5 M . Amount of oxalic acid absorbed per gm of charcoal is
A. 3.15 g
B. 3.45 g
C. 6.30 g
D. None

Answer: A

## (D) Watch Video Solution

9. Silver iodide is used for producing artifical rain because Agl
A. is easy to spray at high altitude
B. is easy to synthesize
C. has crystal structure similar to ice
D. is insoluble in water

## - View Text Solution

10. Isoelectric point is the $p H$ at which colloidal particles
A. coagulate
B. become electrically neutral
C. can move towards either electrode
D. All of these

Answer: D
11. The nucler reacion,
${ }_{\cdot 29}^{63} \mathrm{Cu}+\cdot{ }_{2}^{4} \mathrm{He} \rightarrow{ }_{\cdot 17}^{37} \mathrm{Cl}+14 \cdot{ }_{1}^{1} \mathrm{H}+16 \cdot{ }_{0}^{1} n$
represents:
A. Artificial radioactivity
B. Induced radioactivity
C. Nuclear reaction
D. Spallation reaction

Answer: D

- Watch Video Solution

12. The mass Co-59 is 58.9332 . What is the value of its packing fraction ?

$$
\begin{aligned}
& \text { A. }-11.322 \\
& \text { B. } 11.322 \times 10^{4} \\
& \text { C. } 1.132 \times 10^{4} \\
& \text { D. }-1.132 \times 10^{3}
\end{aligned}
$$

Answer: A

## - Watch Video Solution

13. If the nuclear radius of.${ }^{27} A 1$ is 3.6 Fermi, the approximate nuclear radius of 64 Cu in Fermi is:
A. 1 Fermi
B. 5.6 Fermi
C. 6.5 Fermi
D. 3.8 Fermi

## Answer: B

## - Watch Video Solution

14. A cyclotron cannot accelerate
A. protons
B. deutrons
C. neutrons

## D. $\alpha$-particles

## Answer: C

## - View Text Solution

15. Nuclear power reactors are operated at low temperature and consequently will lower efficiency because
A. nuclear heat is carried by ordinary steam
B. uranium is difficult to heat
C. the walls of nuclear reactors cannot with stand

## D. All the above

Answer: C

## - View Text Solution

16. The source of energy of Red giant Stars, which are cooler than sun is
A. Fission
B. Fusion
C. Burning of coal
D. Burning of gases.

## - View Text Solution

17. If 200 MeV energy is released in the fission of a single nucleus of ${ }_{92}^{235} U$ how many fissions must occur per second to produce a power of 1 k W
A. $22222 \mathrm{sec}^{-1}$
B. $3.2 \times 10^{-11} \mathrm{sec}^{-1}$
C. $31.25 \times 10^{13} \mathrm{sec}^{-1}$
D. $31.25 \times 10^{12} \mathrm{sec}^{-1}$

## - View Text Solution

18. All colloidal solutions show :
A. very high osmotic pressure
B. high osmotic pressure
C. low osmotic pressure
D. no osmotic pressure

## Answer: C

- Watch Video Solution

19. An atom of radium combines with two atoms of chlorine to form $\mathrm{RaCl}_{2}$ molecules. The radioactivity of $R a C l_{2}$ will be
A. as much as that of same quantity of Ra
B. one third of the same qunatity of Ra
C. one half of the same quantity of Ra
D. zero

## Answer: A

## - View Text Solution

## 20. All cell do not contain

A. an anode
B. a cathode
C. ions
D. a Porous parition

## Answer: D

## D View Text Solution

21. which of the following can be used in an electrode?
A. a nail
B. A glass rod
C. A wooden rod
D. None

Answer: A

## - View Text Solution

22. Given standard electrode potentials:
$F e^{3+}+3 e^{-} \rightarrow F e, E^{\circ}=-0.036$ volt
$F e^{2+}+2 e^{-} \rightarrow F e, E^{\circ}=-0.040$ volt
The standard electrode potential $E^{\circ}$ for

$$
\mathrm{Fe}^{3+}+e^{-} \rightarrow \mathrm{Fe}^{2} \text { is:- }
$$

A. 0.772 V
B. -0.404 V
C. +0.404 V
D. -0.772 V

## Answer: A

## - Watch Video Solution

23. The differnce between a decinormal solutions of hydrochloric acid and a decinormal solution of acetic acid is that
A. one of them is corrosive and the other is not
B. one of them conducts electricity and the other does not
C. one of them decomposes sodium carbonate and the other does not
D. one of them contains undisociated molecules of the acid and the other does not

## Answer: D

## - View Text Solution

24. Ostwald's dilution law is not obeyed by
A. $\mathrm{CH}_{3} \mathrm{COOH}$
B. $\mathrm{NH}_{4} \mathrm{OH}$
C. HCN
D. KCl

## Answer: D

## - View Text Solution

25. In the salt bridge KCI is used because
A. it is an electrolyte
B. it is an ionic compound
C. it is a good conductor of electricity
D. the transport number of $\mathrm{K}^{+}$and $\mathrm{Cl}^{-}$are the
same

## Answer: D

## - View Text Solution

26. Nuclide having the same number of protons and also neutrons nut differ in radioactivity are called as
A. isotones
B. isobars
C. nuclear Isomers
D. isodiaphers

## Answer: C

## - Watch Video Solution

27. Neutrions was predicted to:
A. conserve mass of the reaction
B. conserve charge of the reaction
C. conserve spin of the reaction
D. All the above

## Answer: C

28. Colloidion is a colloidal solution of
A. source in water
B. cellulose in water
C. cellulose nitrate in water
D. cellulose nitrate in ethyl alcohol

## Answer: D

- View Text Solution

29. A catalyst in the finely divided state is more efficient because in this state
A. it has larger activation energy
B.it can react with one of the reactant more efficiently
C. it has large surface area
D. All the above

## Answer: C

## D View Text Solution

30. Conductivity water is
A. the water whose own conductance is very very
B. highly purified water containing no suspended impurity
C. the water whose conductance is quite high
D. the water which has been sterilised.

## Answer: A

## - View Text Solution

31. Which of the following reactions leads the formation of colloidal solution?
A. $\mathrm{Cu}+\mathrm{HgCl}_{2} \rightarrow \mathrm{CuCl}_{2}+\mathrm{Hg}$
B. $2 \mathrm{HNO}_{3}+3 \mathrm{H}_{2} \mathrm{~S} \rightarrow 3 \mathrm{~S}+\mathrm{H}_{2} \mathrm{O}+2 \mathrm{NO}$
C. $2 \mathrm{Mg}+\mathrm{CO}_{2} \rightarrow 2 \mathrm{MgO}+\mathrm{C}$
D. $\mathrm{Cu}=\mathrm{CuCl}_{2} \rightarrow \mathrm{Cu}_{2} \mathrm{Cl}_{2}$

Answer: B

## - View Text Solution

32. The phenomenon of Synersis is
A. separation of the dispersed phase form the gel
B. formation of a sol from a gel
C. migration of colloid in an electric field
D. process of converting gel into a true solution.

## Answer: A

## - View Text Solution

33. Ferric chloride is applied to stop bleeding cut because
A. $\mathrm{Fe}^{+}$ions coagulate blood which is a negatively charged solution
B. $\mathrm{Fe}^{3+}$ ion coagulate blood which is a positively
charged solution
C. $\mathrm{Cl}^{-}$ions coagulate blood which is a positively charged solution
D. $\mathrm{Cl}^{-}$ions coagulate blood which is a negatively charged solution.

## Answer: A

## - Watch Video Solution

34. $Z S M-5$ is used to conver :
A. Alcohol to Petrol
B. Benzene to Toluence
C. Toluence to Benzene
D. Heptance to Toluence

## - Watch Video Solution

35. which of the following does not contain a hydrophobic structures.
A. Linseed oil
B. Ianolin
C. Glycogen
D. Rubber

Answer: D

## 36. Colloidal sulphur is used as

A. a disinfectant
B. a germ killer
C. a treating eye diseases
D. a to raise vitality of human system

## Answer: B

## - View Text Solution

37. Colloidal gold is given by injection
A. to act as a disinfectant
B. to act as a germ killer
C. for treating eye diseases
D. to raise vitality of human system

## Answer: D

## - View Text Solution

38. Lysione is used as
A. disinfectant
B. germ
C. treating eye diseases

# D. to raise vitality of human system 

Answer: A

## D View Text Solution

39. Example of intrinsic colloid is
A. Egg -albumin
B. Sulphur
C. Arsenic sulphide
D. Ferric hydroxide
40. Term catalyst was given by
A. Rutherford
B. Berzelius
C. Wohler
D. Kolbe

Answer: B

- View Text Solution

Unit Test 4

1. In the reaction
$3 \mathrm{Br}_{2}+6 \mathrm{CO}_{3}^{2-}+3 \mathrm{H}_{2} \mathrm{O} \rightarrow 5 \mathrm{Br}^{-}+2 \mathrm{BrO}_{3}^{-}+6 \mathrm{HCO}_{3}^{-}$
A. Bromine is oxidized and carbonate is reduced
B. Bromine is reduced and water is oxidized
C. Bronine is neither oxidized nor reduced
D. Bromine is both reduced nad oxidized

## Answer: D

- Watch Video Solution

2. Which of the following is a redox reaction ?
A. $\mathrm{H}_{2} \mathrm{SO}_{4}$ with NaOH
B. In atmosphere, $O_{3}$ from $O_{2}$ by lightning
C. Nigrogen oxides form nitrogen and oxygen by lightning
D. Evaporation of $\mathrm{H}_{2} \mathrm{O}$

## Answer: C

## - View Text Solution

3. For the redox reaction
$\mathrm{MnO}_{4}^{-}+\mathrm{C}_{2} \mathrm{O}_{4}^{2-}+\mathrm{H}^{+} \rightarrow \mathrm{Mn}^{2+}+\mathrm{CO}_{2}+\mathrm{H}_{2} \mathrm{O}$

The correct coefficients of the reactants for the balanced reaction are
A. $\mathrm{MnO}_{4}^{-} \quad \mathrm{C}_{2} \mathrm{O}_{4}^{2-} \quad \mathrm{H}^{+}$
2
5
16
B. $\mathrm{MnO}_{4}^{-} \quad \mathrm{C}_{2} \mathrm{O}_{4}^{2-} \quad \mathrm{H}^{+}$
C. $\begin{aligned} & 16 \\ & 5\end{aligned}$
5
2
$\mathrm{MnO}_{4}^{-} \quad \mathrm{C}_{2} \mathrm{O}_{4}^{2-} \quad \mathrm{H}^{+}$
$5 \quad 16 \quad 2$
D. $\begin{array}{lll}\mathrm{MnO}_{4}^{-} & \mathrm{C}_{2} \mathrm{O}_{4}^{2-} & \mathrm{H} \\ 2 & 16 & 5\end{array}$

## Answer: A

## - Watch Video Solution

4. The chemical that undergoes self oxidation and self reduction in the same reaction is
A. benzyl alcohol
B. acetone
C. formaldehyde
D. acetic acid

## Answer: C

## - Watch Video Solution

5. In which of the following pairs, there is greatest difference in the oxidation number of the underlined elements ?
A. $\underline{N O} O_{2}$ and $\underline{N}_{2} O_{4}$
B. $\underline{P}_{2} O_{5}$ and $\underline{P}_{4} O_{10}$
C. $\underline{N}_{2} \mathrm{O}$ and $\underline{\mathrm{N}} \mathrm{O}$
D. $\underline{S} O_{2}$ and $\underline{S} O_{3}$

## Answer: D

## D Watch Video Solution

6. One of the following has both positive and negative oxidation states
A. Fe
B. Cl
C. He
D. Na

Answer: B

## - Watch Video Solution

7. In which of the following compounds, the oxidation number of iodine is fractional ?
A. $I F_{7}$
B. $I_{3}^{-}$
C. $I F_{5}$
D. $I F_{3}$

## - Watch Video Solution

8. In which of the following, elements has least oxidation number?
A. $N i(C N)_{4}$
B. $\mathrm{Ni}(\mathrm{CO})_{4}$
C. $\mathrm{Fe}_{2} \mathrm{O}_{3}$
D. $S F_{6}$

Answer: B
9. $A, B$ and $C$ are three elements forming a compound in which their oxidation state are $+2,+5$, and -2 respectively. Which could not be the formula of compound?
A. $A_{2}(B C)_{2}$
B. $A_{2}\left(B C_{4}\right)_{3}$
C. $A_{3}\left(B C_{4}\right)_{2}$
D. $A B C$

## Answer: C

10. When $\mathrm{KMnO}_{4}$ acts as an oxidising agnet and ultimetely from $\mathrm{MnO}_{4}^{2-}, \mathrm{MnO}_{2}, \mathrm{Mn}_{2} \mathrm{O}_{3}$, and $\mathrm{Mn}^{2+}$, then the number of electrons transferred in each case, respectively, are
A. $4,3,1,5$
B. 1,5,3,7
C. 1,3,4,5
D. 3,5,7,1

## Answer: C

11. Which of the following reactions involves neither oxidation nor reduction?
A. $\mathrm{CrO}_{4}^{2-} \rightarrow \mathrm{Cr}_{2} \mathrm{CrO}_{7}^{2-}$
B. $\mathrm{Cr} \rightarrow \mathrm{CrCl}_{3}$
C. $N a \rightarrow N a^{+}$
D. $2 \mathrm{~S}_{2} \mathrm{O}_{3}^{2-} \rightarrow \mathrm{S}_{4} \mathrm{O}_{6}^{2-}$

## Answer: A

## D Watch Video Solution

12. In the following reaction,
$4 \mathrm{P}+3 \mathrm{KOH}+3 \mathrm{H}_{2} \mathrm{O} \rightarrow 3 \mathrm{KH}_{2} \mathrm{PO}_{2}+\mathrm{PH}_{3}$
A. only phosphorus is oxidized
B. only phosphorus is reduced
C. phosphorus is both oxidized and reduced
D. phosphorus is neither oxidized nor reduced

## Answer: C

## - Watch Video Solution

13. The most powerful oxidizing agent in the following is
A. $\mathrm{H}_{3} \mathrm{Bo}_{3}$
B. $\mathrm{HPO}_{3}$
C. $\mathrm{H}_{3} \mathrm{PO}_{4}$
D. $\mathrm{H}_{2} \mathrm{SO}_{4}$

## Answer: D

## - View Text Solution

14. A current of 2.0 A passed for 5 hours through a molten metal salt deposits 22.2 g of metal (At. Wt.
$=177$ ). The oxidation state of the metal in the metal salt
is
A. +1
B. +2
C. +3
D. +4

## Answer: C

## - Watch Video Solution

15. on passing a current of 1.0 ampre for 16 min and 5
sec through one litre solution of $\mathrm{CuCl}_{2}$ all the copper of the solution was solution was peposited at cathode.

The strength of $\mathrm{CuCl}_{2}$ solution was (Molar mass of
$\mathrm{Cu}=63.5$ faraday constant $=96500 \mathrm{Cmol}^{-1}$ )
A. 0.07 M
B. 0.2 N
C. 0.005 N
D. 0.02 N

Answer: C

## - View Text Solution

16. In a solution of $\mathrm{CuSO} \mathrm{C}_{4}$ how much time will be required to preciitate 2 g copper by 0.5 ampere current?
A. 12157.48 sec
B. 102 sec
C. 510 sec
D. 642 sec

## Answer: A

## - Watch Video Solution

17. Conductivity ( S m ) is directly proportional to area of
the plates and the concentration of solution ( mol
$m^{-3}$ ) in it and is inversely proportional to the distance
between plates then the unit of constant of proportionality is
A. $S m \mathrm{~mol}^{-1}$
B. $S m^{2} \mathrm{~mol}^{-1}$
C. $S^{-2} m^{2} \mathrm{~mol}$
D. $S^{2} m^{2} \mathrm{~mol}^{-2}$

Answer: A

## D View Text Solution

18. The cell constant of a given cell is $0.47 \mathrm{~cm}^{-1}$. The resistance of a solution placed in this cell is measured to be 3.16 ohm . The conductivity of the solution (in
$\mathrm{Acm}^{-1}$ where S has usual meaning ) is
A. 0.15
B. 1.5
C. 0.015
D. 150

## Answer: C

## - View Text Solution

19. The resistance of $1 N$ solution of acetic acid is 250 ohm , when measured in a cell of cell constant $1.15 \mathrm{~cm}^{-1}$. The equivalent conductance (in ohm ${ }^{-1} \mathrm{~cm}^{2} e q^{-1}$ ) of $1 N$ acetic acid is
A. 4.6
B. 9.2
C. 18.4
D. 0.023

Answer: A

## D Watch Video Solution

20. The conductivity of saturated solution of $\mathrm{BaSO}_{4}$ is $3.06 \times 10^{-6} \mathrm{ohm}^{-1} \mathrm{~cm}^{-1}$ and its equivalent conductance is $1.53 \mathrm{ohm}^{-1} \mathrm{~cm}^{2}$ equiv $^{-1}$. The $K_{s p}$ for $\mathrm{BaSO}_{4}$ will be:
A. $4 \times 10^{-12}$
B. $2.5 \times 10^{-9}$
C. $2.5 \times 10^{-13}$
D. $4 \times 10^{-6}$

## Answer: D

## D Watch Video Solution

21. What will be the emf for the given cell ?

$$
P t\left|H_{2}\left(g, P_{1}\right)\right| H^{+}(a q)\left|H_{2}\left(g, P_{2}\right)\right| P t
$$

A. $\frac{R T}{F} \operatorname{In} \frac{P_{1}}{P_{2}}$
B. $\frac{R T}{2 F} \operatorname{In} \frac{P_{1}}{P_{2}}$
C. $\frac{R T}{F} \operatorname{In} \frac{P_{2}}{P_{1}}$

## D. None of these

Answer: B

## - Watch Video Solution

22. On the basis of information available from the reaction
$\frac{4}{3} \mathrm{Al}+\mathrm{O}_{2} \rightarrow \frac{2}{3} \mathrm{Al}_{2} \mathrm{O}_{3}, \Delta G=-827 \mathrm{kJmol}^{-1}$ of $\mathrm{O}_{2}$,
the minimum emf required to carry out of the electrolysis of $\mathrm{Al}_{2} \mathrm{O}_{3}$ is $\left(F=96,500 \mathrm{Cmol}^{-1}\right)$
A. 4.28 V
B. 6.42 V
C. 8.50 V
D. 2.14 V

## Answer: D

## - Watch Video Solution

23. In the electrochemical reaction
$2 F e^{3+}+Z n \rightarrow Z n^{2+}+2 F e^{2+}$
Increasing the concentration of $F e^{2+}$
A. increases cell emf
B. increases the current flow
C. decreases the cell emf

## D. alters the pH of the solution.

Answer: C

## D View Text Solution

24. If salt bridge is removed from two half cells, the voltage
A. drops to zero
B. does not changes
C. increase gradually
D. increases rapidly

## Answer: A

## - View Text Solution

25. The standard hydrogen electrode potential is zero, because
A.there is no potential differnce between the electrode and the solution
B. hydrogen ions acquire electrons from a platinum electrode
C. it has been measured accurately
D. it has been defined that way.

## Answer: D

## - View Text Solution

26. The standard reduction potential for $\mathrm{Fe}^{2+} / \mathrm{Fe}$ and $\mathrm{Sn}^{2+} / \mathrm{Sn}$ electrodes are -0.44 and -0.14 volt respectively. For the given cell reaction $\mathrm{Fe}^{2+}+\mathrm{Sn} \rightarrow \mathrm{Fe}+\mathrm{Sn}^{2+}$, the standard $E M F$ is.
A. +0.30 V
B. -0.58 V
C. +0.58 V
D. -0.30 V

## Answer: D

## - Watch Video Solution

27. Standard potential $\left(E^{\circ}\right)$ for some half reactions are given below
(i) $S n^{4+}+2 e^{-} \rightarrow S n^{2+}, E^{\circ}=0.15 V$
(ii) $2 \mathrm{Hg}^{2+}+2 \mathrm{e}^{-} \rightarrow \mathrm{Hg}_{2}^{2+}, E^{\circ}=0.92 \mathrm{~V}$
(iii)
$\mathrm{PbO}_{2}+4 \mathrm{H}^{+}+2 e^{-} \rightarrow \mathrm{Pb}^{2+}+2 \mathrm{H}_{2} \mathrm{O}, E^{\circ}=+1.45 \mathrm{~V}$
based on the above, which one of the following statements is correct ?
A. $S n^{4+}$ is a stronger oxidising agent than $\mathrm{Pb}^{4+}$
B. $S n^{2+}$ is a stronger reducing agent than $\mathrm{Hg}_{2}^{2+}$
C. $\mathrm{Pb}^{2+}$ is a stronger oxidizing agent than $\mathrm{Pb}^{4+}$
D. $\mathrm{Pb}^{2+}$ is a stronger reducing agent than $\mathrm{Sn}^{2+}$

## Answer: B

## D View Text Solution

28. A smuggler could not carry gold by depositing iron chemically on the gold surface since
A. gold is denser
B. iron rusts
C. gold has higher reduction potential than iron

## D. gold has lower reduction potential than iron

## Answer: C

## - View Text Solution

29. The emf of a Daniell cell at $298 K$ is $E_{1}$
$\mathrm{Zn}\left|\mathrm{ZnSO}_{4}(0.01 \mathrm{M})\right|\left|\mathrm{CuSO}_{4}(1.0 \mathrm{M})\right| \mathrm{Cu}$
When the concentration of $\mathrm{ZNSO}_{4}$ is 1.0 M and that
of $\mathrm{CuSO}_{4}$ is 0.01 M , the emf changed to $E_{2}$. What is
the relationship between $E_{1}$ and $E(2)$ ?
A. $E_{1}<E_{2}$
B. $E_{1}=E_{2}$
C. $E_{2}=0 \neq E_{1}$
D. $E_{1}>E_{2}$

## Answer: D

## - Watch Video Solution

30. Mark the false statement.
A. A salt bridge is used to eliminate liquid junction potential
B. The Gibb's free energy , $\Delta G$ is related with electromotive force as $\Delta G=-n F E$
C. Nernest equation for single electrode potential is

$$
E=E^{\circ}-\frac{R T}{n F} \log _{e}\left[M^{n+}\right]
$$

D. The efficiency of a hydrogen-oxygen fuel cell is zero.

## Answer: C

## - View Text Solution

31. Cloud or fog is a colloidal in which the dispered phase and the dospersion medium are
A. gas, liquid
B. liquid, gas
C. liquid, liquid
D. solid, liquid

## Answer: B

## - Watch Video Solution

32. Which of the following constitutes irreversible colloidal system in water as dispersion medium?
A. Clay
B. Platinum
C. $\mathrm{Fe}(\mathrm{OH})_{3}$
D. All

## Answer: D

## - View Text Solution

33. surface tension of lyophilic sols is
A. lower than that of $\mathrm{H}_{2} \mathrm{O}$
B. more than that of $\mathrm{H}_{2} \mathrm{O}$
C. equal to that of $\mathrm{H}_{2} \mathrm{O}$
D. none of the above

Answer: A
34. Colloid of which one of the following can prepared by electrical dispersion method as well as reduction method?
A. Sulphur
B. Ferric hydroxide
C. Arrhenius sulphide
D. Gold

Answer: D
35. The formation of a colloidal from suspension is
A. Peptisation
B. Condensation
C. Sedimenatation
D. Fragmentation

Answer: A
(D) Watch Video Solution
36. the stability of lyophilic colloids is due to
A. Change in their particles
B. Large size of their particle
C. small size of their particle
D. A layer of dispersion medium

## Answer: D

## D Watch Video Solution

37. At CMC, the surfactant molecules :
A. decompose
B. become completely soluble
C. associate
D. dissociate

## Answer: C

## - Watch Video Solution

38. Which one of the following is an incorrect statement for physiosorption ?
A. It is reversible process
B. It requires less heat of adsorption
C. It requires activation energy
D. It takes place at low temperature

Answer: C
39. The half life of ${ }^{24} \mathrm{Na}$ is 15.0 hours. What percentage of it remains after 60 hours ?
A. 0
B. 0.0331
C. 0.0625
D. $12.5 \%$

Answer: C

- Watch Video Solution

40. At equilibrium, number of atoms disintegrating at two different stages are in the ratio of $1: 10$. It half life of first stages is 15 minutes, half life of second stage would be
A. 150 min
B. 15 min
C. 1.5 min
D. 30 min

Answer: A

## Evaluate Yourself

1. One among the following set of quantum numbers defines the highest energy electron in scandium (I)ion
A. $n=3, \mathrm{l}=1, \mathrm{~m}=0, \mathrm{~s}=+1 / 2$
B. $\mathrm{n}=3, \mathrm{l}=0, \mathrm{~m}=0, \mathrm{~s}=-1 / 2$
C. $n=4, \mathrm{l}=0, \mathrm{~m}=0, \mathrm{~s}=+1 / 2$
D. $n=3,1=2, m=2, s=+1 / 2$

Answer: C
2. If threshold wavelength $\left(\lambda_{0}\right)$ for ejection of electron from metal is 330 nm , then work function for the photoelectron emission is
A. $1.2 \times 10^{-18} J$
B. $6.0 \times 10^{-19} \mathrm{~J}$
C. $1.2 \times 10^{-20} J$
D. $6.0 \times 10^{-12} J$

Answer: B::D

- Watch Video Solution

3. All elements in the third period have
A. three complete shells
B. three complete subshells
C. three valence electrons
D. three electrons less than octet.

## Answer: B

## D View Text Solution

4. One among the following species is planar
A. $P C l_{3}$
B. $\mathrm{CO}_{3}^{2-}$
C. $\mathrm{NH}_{3}$
D. $\mathrm{SO}_{4}^{2-}$

## Answer: B

## D Watch Video Solution

5. From amongst the following triatomic molecules the least bond angle is in
A. $O_{3}$
B. $I_{3}^{-}$
C. $\mathrm{NO}_{2}^{-}$
D. $H_{2} S$

Answer: D

## - View Text Solution

6. The atoms/ion listed in correct order of increasing size are
A. $\mathrm{Na}, \mathrm{Si}, \mathrm{H}$
B. $B e^{2+}, M g^{2+}, N a^{+}$
C. Al, $\mathrm{Na}, \mathrm{S}$
D. $\mathrm{Na}^{+}, \mathrm{Cl}^{-}, \mathrm{K}^{+}$

## Answer: B

## - View Text Solution

7. The solution of Schrodinger equation for hydrogen leads to three quantum numbers $\mathrm{n}, \mathrm{l}, m_{1}$
(i) n can have any integral value
(ii) When $n=3, I$ can have value of $0,1,2$
(iii) When $\mathrm{n}=5, \mathrm{l}=2, m_{1}$ can have values ranging between
+2 to -2 through
(iv) when $\mathrm{n}=2, \mathrm{l}=1$, three equivalent orbitals with a nodal
plane containing nucleus of the H atom are possible.
Out of these the correct one is /are
A. (i), (ii) ,(iii)
B. only (ii)
C. (ii) \& (iv)
D. (i), (ii), (iii) \& (iv)

## Answer: A

## - View Text Solution

8. In which of the following are all the electrons paired
?
A. An atom with atomic no. 17
B. $F e^{3+}$
C. An element with configuration $1 s^{2} 2 s^{2} 2 p^{6} 3 s^{2} 3 p^{2}$
D. $N^{3-}$

## Answer: D

## - Watch Video Solution

9. The diamagnetic molecules from among mole cules of second period elements are
A. $B_{2}, C_{2}, N_{2}$
B. $L i_{2}, N_{2}, F_{2}$
C. $C_{2}, N_{2}, F_{2}$
D. $B_{2}, O_{2}^{2-}, N_{2}$

## Answer: C

## - Watch Video Solution

10. Which of the following statements is correct ?
A. A small cation minimises polarisation.
B. The second ionisation erergy of $\mathrm{C}, \mathrm{N}$ and O
follows the order $C<N<O$
C. The magnitude of lattice energy of a solid increases if ions are of equal size
D. Energy of $\sigma_{2 s}>\sigma_{1 s}^{*}$ because $\sigma_{2 s}$ is bonding and $\sigma_{1 s}^{*}$ is antibonding molecular orbital

## - View Text Solution

11. Amongst phosphorus halides the correct increasing order of bond angle is
A. $P F_{3}<P C l_{3}<P B r_{3}$
B. $P B r_{3}<P C l_{3}<P F_{3}$
C. $P C l_{3}<P F_{3}<P B r_{3}$
D. $P B r_{3}<P F_{3}<P C l_{3}$

Answer: A
12. The State of hybridisation of phosphorus $(Z=15)$ in phosphate ion $\left(\mathrm{PO}_{4}^{3-}\right)$ is the same as
A. 1 in $\mathrm{ICI}_{4}^{-}$
B. S in $\mathrm{SO}_{3}$
C. N in $\mathrm{NO}_{3}^{-}$
D. S in $\mathrm{SO}_{3}^{2-}$

## Answer: D

13. The strength of $\sigma$ bond formed by s-s, s-p \& p-p overlaps are in the order
A. $s-s>s-p>p-p$
B. $p-p>s-s->s-p$
C. $p-p>s-p>s-s$
D. $s-s>p-p>s-p$

Answer: B

- View Text Solution

14. In a crystalline solid, W atoms are at corners, O atoms at edge centres and Na at cube centre, The formula of solid is
A. $N a_{4} W O_{3}$
B. $\mathrm{NaWO}_{3}$
C. $\mathrm{NaW}_{8} \mathrm{O}_{3}$
D. $\mathrm{NaWO} \mathrm{O}_{4}$

Answer: B
15. A binary solid, $A^{+} B^{-}$( formula mass $=60$ ) has a

CsCl structure. The no. of unit cells present in 6 g ideal crystals of solid are
A. $6.02 \times 10^{22}$
B. $6.02 \times 10^{23}$
C. $3.01 \times 10^{23}$
D. $3.01 \times 10^{22}$

Answer: A
16. The molecular orbital shown below is described as

A. $\sigma^{*}$
B. $\sigma$
C. $\pi$
D. non bonding.

Answer: A
17. Which among the following molecules has the largest dipole moment ?
A. $\mathrm{CH}_{3} \mathrm{CH}_{2} \mathrm{Cl}$
B. $\mathrm{CHCl}_{3}$
C. $\mathrm{NF}_{3}$
D. $\mathrm{XeF}_{4}$

Answer: A

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18. The difference between $\Delta H$ and $\Delta E$ at constant voluem is equal to
A. $P \delta V$
B. R
C. $V \Delta P$
D. $\frac{3}{2} R$

Answer: C

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19. If the critical frequency $\left(v_{0}\right)$ for emission of photoelectrons from a metal is $9.62 \times 10^{14} s^{-1}$, then
light that can emit photoelectons should have a wavelength equal to
A. $6000 \AA$
B. $5000 \AA$
C. $4500 \AA$
D. $3000 \AA$

Answer: D

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20. The expected wavelength at which the first line of $P$ fund series shall be obtained is
A. $2.63 \mu$
B. $7.45 \mu$
C. $3.90 \mu$
D. $4.05 \mu$

## Answer: B

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21. The correct order of electron affinity among
(i) Na (ii) Mg (iii) F (iv) I is
A. $(i v)>(i i i)>(i)>(i i)$
B. $(i i)>(i i i)>(i v)>(i)$
C. $(i i i)>(i v)>(i)>(i i)$
D. $(i)>(i i)>(i i i)>(i v)$

## Answer: C

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22. From the following enthalpies of combution, deduce which of the quoted expressions gives the heat of formation at a fixed temp.
$C(s)+O_{2}(g) \rightarrow \mathrm{CO}_{3}(g), \Delta H=c$
$H_{2}(g)+1 / 2 \mathrm{O}_{2}(g) \rightarrow \mathrm{H}_{2} \mathrm{O}(l), \Delta=h$
$\mathrm{CH}_{4}(g)+2 \mathrm{O}_{2}(g) \mathrm{CO}_{2}(g)+2 \mathrm{H}_{2} \mathrm{O}(l), \Delta H=m$
A. $c+h-m$
B. $c-h+m$
C. $c+2 h-m$
D. $-1 / 2 \mathrm{c}-\mathrm{h}+1 / 2 \mathrm{~m}$

## Answer: C

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23. The combustion of benzoic acid occurs according to
$\mathrm{C}_{6} \mathrm{H}_{5} \mathrm{COOH}(s)+7 \frac{1}{2} \mathrm{O}_{2}(g) \Leftrightarrow 7 \mathrm{CO}_{2}+3 \mathrm{H}_{2} \mathrm{O}(l)$ in a bomb calorimeter at $25^{\circ} \mathrm{C}$. If it liberates $Q_{v} \mathrm{~mol}^{-1}$, then $\Delta H$ for reaction is

$$
\begin{aligned}
& \text { A. }-Q_{v}+(R T)^{1 / 2} \\
& \text { B. }-Q_{v}+(R T)^{-1 / 2} \\
& \text { C. }-Q_{v}+\frac{1}{2} R T \\
& \text { D. }-Q_{v}-\frac{1}{2} R T
\end{aligned}
$$

## Answer: D

24. During the solid-liquid transition at the melting point
A. $\Delta H=0$
B. $\Delta G=0$
C. $\Delta S=0$
D. $\Delta E=0$

Answer: B

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25. From amogst $\mathrm{Al}^{3+}, \mathrm{Cl}^{-}, \mathrm{K}^{+}, \mathrm{N}^{3-}$, the correct order of radii is
A. $A l^{3+}<N_{3-}<K^{+}<\mathrm{Cl}_{-}$
B. $\mathrm{N}^{3-}<\mathrm{Al}^{3+}<\mathrm{Cl}^{-}<\mathrm{K}^{+}$
C. $A l^{3+}<K^{+}<\mathrm{Cl}^{-}<\mathrm{N}^{3-}$
D. $K^{+}<\mathrm{Cl}^{-}<A l^{3+}<N^{3-}$

Answer: A

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26. The enthaply change, $\Delta H$, in a simple one step
reaction is $>0$, so, the $E_{a}$ (activation energy) of reaction is , therefore
A. equal to $\Delta H$
B. never greater than $\Delta H$
C. never less than $\Delta H$
D. equal to zero.

## Answer: C

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27. The half life of a first order reaction is 60 sec . The percentage of reactant left after 3 minutes is
A. 7.5
B. 15
C. 25
D. 12.5

## Answer: D

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28. If the reaction,$A+B \rightarrow C+D$, is
thermodynamically feasible, the time taken for half of reaction to occur will depend most precisely on
A. $\Delta S$
B. $\Delta H$
C. $\Delta G$
D. $E_{a}$

Answer: D
29. For a hypothetical reaction, the following kinetic data suggested that the overall order of this reaction is
[A]
[B]
[C]
$\mathrm{mol} \quad \mathrm{dm}^{-3} \mathrm{~mol} \quad \mathrm{dm}^{-3} \mathrm{~mol} \quad \mathrm{dm}^{-3} \mathrm{~s}^{-1}$
2.0
2.0
1.0
1.0
2.0
1.0
4.0
4.0
1.0
A. 3
B. 1.5
C. 1
D. 0.5

Answer: B
30. A reaction rate contant doubles between 300 and

310 k . By which of the following factors does the rate constant increases between 400-410 K.
A. 3.39
B. 2
C. 1.48
D. 1.1

## Answer: C

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31. If $t_{0.5}$ of a first order reaction, $P C l_{5} \rightarrow P C l_{3}+C l_{2}$ is 10 minutes then the time in which the concentration of $P C l_{5}$ reduces to $10 \%$ of the original is
A. 26 min
B. 33 min
C. 71 min
D. 90 min

Answer: B

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32. The d-orbital involved in $s p^{3} d$ hybridisation is
A. $d_{x y}$
B. $d_{x 2-y 2}$
C. $d_{x z}$
D. $d_{z}^{2}$

## Answer: D

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33. A molecules $M L_{5}$ contains 5 s bonding pairs of electrons and one non-bonding pair in V-shell of M . The shape of electron pair distribution is
A. octahedral
B. square planer
C. trigonal bipyramidal
D. sqaure pyramidal

## Answer: D

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34. If heat of formation of HI in the given reactions
(i) $\mathrm{H}_{2}(g)+\mathrm{I}_{2} \rightarrow I_{2}(s) \rightarrow 2 \mathrm{HI}$
(ii) $\mathrm{H}_{2}(g)+\mathrm{I}_{2}(g) \rightarrow 2 \mathrm{HI}(g)$
are 26 KJ and $-4.5 \mathrm{~mol}^{-1}+$ respectively, then the heat of sublimation of iodine is
A. 30.5 KJ
B. 61.0 KJ
C. 21.5 KJ
D. $-30.5 K J$

## Answer: B

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35. The entropy change produced in universe when 3.6
kg of water of $47^{\circ} \mathrm{C}$ loses 12 J heat into surrounding at
$27^{\circ} \mathrm{C}$ is
A. $12 \mathrm{JK}^{-1}$
B. $0.12 \mathrm{JK}^{-1}$
C. $0.0025 \mathrm{JK}^{-1}$
D. unpredictable

## Answer: C

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36. A sample of radioactive element undergoes $90 \%$ decomposition in 336 minutes. Its $t_{0.5}$ in minutes is
A. $(\ln 2 / / \ln 10) \times 366$
B. $1 / 366$
C. $(\ln 2 / 1 \ln 90) \times 366$
D. 183

Answer: A

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37. The vant Hoff factor (i) for a dilute solution of potassium aluminium sulphate is
A. 4
B. 5
C. 3
D. unpredictable

## Answer: A

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38. A 0.01 M solution of glucose in water freezes at
$-0.0186^{\circ} \mathrm{C}$ A 0.01 M solution of $\mathrm{KNO}_{3}$ in water will
freeze at
A. $-0.0093^{\circ} C$
B. $-0.0372^{\circ} C$
C. $-0.0186^{\circ} \mathrm{C}$
D. $-0.093^{\circ} \mathrm{C}$

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39. 20 mL of HCl having a certain normality neutralises exactly 1.0 g CaCO 3 . The normality of acid is
A. 0.5 N
B. 0.12 N
C. 0.01 N
D. 1.0 N

Answer: D
40. The potential of an electrode is represented as Pt. (0.25 atm) $/ H^{+}[0.5]$
A. 0
B. 0.018 V
C. 0.059 V
D. 0.118 V

Answer: A

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41. For the cell reaction,$|C u| C u^{2+}(a q)\left|A g^{+}\right| A g$ is

$$
E^{\circ} \mathrm{Cu} u^{2} \mid C u=+0.34 V \text { adb } n E^{\circ} \mathrm{Ag}^{+} \mid A g=0.80 V
$$

and $\left[\mathrm{Cu}^{+2}\right]=0.01$ and $\left[\mathrm{Ag}^{+}\right]=1.0 \mathrm{~mol} \mathrm{dm}^{-3}$ the emf of the cell is
A. 0.34 V
B. 0.46 V
C. 0.52 V
D. 1.14 V

## Answer: C

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42. Which of the following is not possible ?
A. $d s p^{3}$
B. $s p^{3} d$
C. $s p^{2} d$
D. $d s p^{2}$

Answer: C

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43. For a reaction,
$S O_{2}(g)+1 / 2 O_{2}(g) \rightarrow S O_{3}(g)$ if $K_{p}=1.7 \times 10^{12}$ at
$20^{\circ} \mathrm{C}$ and 1 atm pressure, then value of $K_{c}$ is
A. $1.7 \times 10^{12}$
B. $0.7 \times 10^{12}$
C. $8.33 \times 10^{12}$
D. $1.2 \times 10^{12}$

## Answer: C

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44. A radioactive isotope having $t_{1 / 2}=3$ days was read after 12 days. If 3 g of the isotope is now left in the container, the initial weight of isotope was
A. 12 g
B. 24 g
C. 36 g
D. 48 g

Answer: D

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45. The number of $\alpha$ and $\beta$-particle emitted in the
transformation
${ }_{92}^{238} U \rightarrow{ }_{92}^{234} U$
A. 1,1
B. 1,0
C. 1,2
D. 2,1

Answer: C

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