FINAL NEET(UG)–2020 EXAMINATION
(Held On Sunday 13th SEPTEMBER, 2020)

| PHYSICS | TEST PAPER WITH ANSWER & SOLUTION |

1. The color code of a resistance is given below

Yellow Violet Brown Gold

The values of resistance and tolerance, respectively, are :

(1) 470 Ω, 5%   (2) 470 kΩ, 5%

(3) 47 kΩ, 10%   (4) 4.7 kΩ, 5%

Ans. (1)

Sol. R = $47 \times 10^1 \pm 5\%$

R = 470 Ω, 5%

2. Find the torque about the origin when a force of $3\hat{j}$ N acts on a particle whose position vector is $2\hat{k}$ m :

(1) $6\hat{k}$ Nm   (2) $6\hat{i}$ Nm

(3) $6\hat{j}$ Nm   (4) $-6\hat{i}$ Nm

Ans. (4)

Sol. $\vec{F} = 3\hat{j}$ N, $\vec{r} = 2\hat{k}$

$\vec{\tau} = \vec{r} \times \vec{F} = 2\hat{k} \times 3\hat{j} = 6(\hat{k} \times \hat{j})$

$= 6(-\hat{i})$

$\vec{\tau} = -6\hat{i}$ Nm

3. A cylinder contains hydrogen gas at pressure of 249 kPa and temperature 27℃.
Its density is : (R = 8.3 J mol^{-1} K^{-1})

(1) 0.02 kg/m³   (2) 0.5 kg/m³

(3) 0.2 kg/m³   (4) 0.1 kg/m³

Ans. (3)

Sol. For an ideal gas sample

$\dfrac{P}{\rho} = \dfrac{RT}{Mw}$

$\rho = \dfrac{PMw}{RT} = \dfrac{249 \times 10^3 \times 2 \times 10^{-3}}{8.314 \times 300} = 0.199$

$\rho = 0.2$ kg/m³

4. Two cylinders A and B of equal capacity are connected to each other via a stop cock. A contains an ideal gas at standard temperature and pressure. B is completely evacuated. The entire system is thermally insulated. The stop cock is suddenly opened. The process is :

(1) isobaric   (2) isothermal

(3) adiabatic   (4) isochoric

Ans. (3)

Sol. Free expansion i.e. expansion against vacuum is adiabatic in nature for all type of gases. It should be noted that temperature final temperature is equal to initial temperature for ideal gases.

5. Two particles of mass 5 kg and 10 kg respectively are attached to the two ends of a rigid rod of length 1 m with negligible mass.

The centre of mass of the system from the 5 kg particle is nearly at a distance of :

(1) 80 cm   (2) 33 cm

(3) 50 cm   (4) 67 cm

Ans. (4)
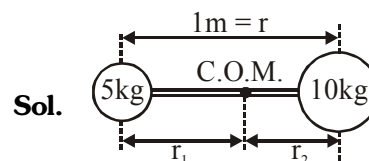
Sol.

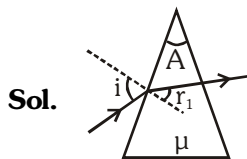mr = constant $\Rightarrow$ r $\propto \dfrac{1}{m}$

$\dfrac{r_1}{r_2} = \dfrac{m_2}{m_1} = \dfrac{10}{5} = \dfrac{2}{1}$

$r_1 = \dfrac{2}{3} r = \dfrac{2}{3} \times 1$ m = 67 cm

6. A ray is incident at an angle of incidence i on one surface of a small angle prism (with angle of prism A) and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, then the angle of incidence is nearly equal to:

(1) $\dfrac{\mu A}{2}$ (2) $\dfrac{A}{2\mu}$

(3) $\dfrac{2A}{\mu}$ (4) μA

Ans. (4)

Sol.

$r_2 = 0$
$r_1 = A$
Apply Snell's law
$\sin i = \mu \sin r_1$
for small angle ($r_1 = A$)
i   μA

7. A body weighs 72 N on the surface of the earth. What is the gravitational force on it, at a height equal to half the radius of the earth?
(1) 24 N   (2) 48 N
(3) 32 N   (4) 30 N

Ans. (3)

Sol. $W_s = mg_s = 72$ N

$$W_h = mg_h = \dfrac{mg_s}{\left(1 + \dfrac{h}{R}\right)^2} = \dfrac{72N}{\left(1 + \dfrac{R/2}{R}\right)^2} = \dfrac{72}{9/4}$$

$W_h = 32$ N

8. An iron rod of susceptibility 599 is subjected to a magnetising field of 1200 A m^{-1}. The permeability of the material of the rod is :
($\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1})
(1) $2.4\pi \times 10^{-7}$ T m A^{-1}
(2) $2.4\pi \times 10^{-4}$ T m A^{-1}
(3) 8.0×10^{-5} T m A^{-1}
(4) $2.4\pi \times 10^{-5}$ T m A^{-1}

Ans. (2)

Sol. $\mu_r = x_m + 1 = 599 + 1 = 600$
$\mu = \mu_o \mu_r = 4\pi \times 10^{-7} \times 600$

$= 2.4\pi \times 10^{-4} \dfrac{Tm}{A}$

9. For transistor action, which of the following statements is **correct**?

(1) The base region must be very thin and lightly doped.

(2) Base, emitter and collector regions should have same doping concentrations.

(3) Base, emitter and collector regions should have same size.

(4) Both emitter junction as well as the collector junction are forward biased.

Ans. (1)

Sol. Base region is very thin and lightly doped.

10. Light with an average flux of 20 W/cm^2 falls on a non-reflecting surface at normal incidence having surface area 20 cm^2. The energy received by the surface during time span of 1 minute is :
(1) 48×10^3 J   (2) 10×10^3 J
(3) 12×10^3 J   (4) 24×10^3 J

Ans. (4)

Sol. $I = \dfrac{E}{At}$

$E = IAt$

$= \dfrac{20}{10^{-4}} \times 20 \times 10^{-4} \times 60$

$= 24 \times 10^3$ J

11. A short electric dipole has a dipole moment of 16×10^{-9} C m. The electric potential due to the dipole at a point at a distance of 0.6 m from the centre of the dipole, situated on a line making an angle of 60° with the dipole axis is :

$$\left(\dfrac{1}{4\pi \in_0} = 9 \times 10^9 \, N m^2 / C^2\right)$$
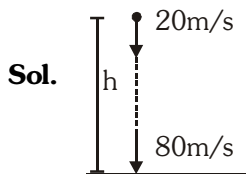
(1) zero   (2) 50 V

(3) 200 V   (4) 400 V

Ans. (3)

Sol. $V = \dfrac{kP\cos\theta}{r^2} = \dfrac{9 \times 10^9 \times 16 \times 10^{-9}}{(0.6)^2} \times \dfrac{1}{2}$

$V = 200$ V

12. A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is : ($g = 10$ m/s^2)

(1) 300 m   (2) 360 m

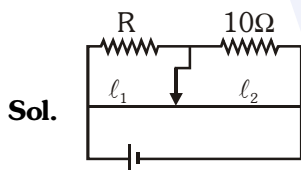(3) 340 m   (4) 320 m

Ans. (1)

Sol.

$v^2 = u^2 + 2gh$

$80^2 = 20^2 + 2 \times 10h$

$h = 300m$

13. A resistance wire connected in the left gap of a metre bridge balances a 10 Ω resistance in the right gap at a point which divides the bridge wire in the ratio 3 : 2. If the length of the resistance wire is 1.5 m, then the length of 1 Ω of the resistance wire is :

(1) 1.5×10^{-2} m   (2) 1.0×10^{-2} m

(3) 1.0×10^{-1} m   (4) 1.5×10^{-1} m

Ans. (3)

Sol.

$\dfrac{R}{10} = \dfrac{\ell_1}{\ell_2}$

$\dfrac{R}{10} = \dfrac{3}{2}$

$R = 15\,\Omega$

Length of 15Ω resistance wire is 1.5 m

∴ length of 1Ω resistance wire = $\dfrac{.5}{15} = 0.1$

$= 1.0 \times 10^{-1}$ m

14. When a uranium isotope $^{235}_{92}U$ is bombarded with a neutron, it generates $^{89}_{36}Kr$, three neutrons and:

(1) $^{103}_{36}Kr$ (2) $^{144}_{56}Ba$

(3) $^{91}_{40}Zr$ (4) $^{101}_{36}Kr$

Ans. (2)

Sol. $^{235}_{92}U + ^1_0n \rightarrow ^{89}_{36}Kr \;\; ^{144}_{56}Ba \;\; 3^1_0n \;\; Q$
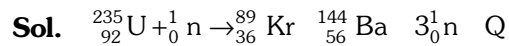
15. A long solenoid of 50 cm length having 100 turns carries a current of 2.5 A. The magnetic field at the centre of the solenoid is :
($\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1})

(1) 3.14×10^{-5} T   (2) 6.28×10^{-4} T

(3) 3.14×10^{-4} T   (4) 6.28×10^{-5} T

Ans. (2)

Sol. $B = \mu_0 \dfrac{N}{\ell}I$

$= 4\pi \times 10^{-7} \times \dfrac{100}{(0.5)} \times 2.5$

$= 6.28 \times 10^{-4}$ T

16. The average thermal energy for a mono-atomic gas is : (k_B is Boltzmann constant and T, absolute temperature)

(1) $\dfrac{7}{2}k_B T$ (2) $\dfrac{1}{2}k_B T$

(3) $\dfrac{3}{2}k_B T$ (4) $\dfrac{5}{2}k_B T$

Ans. (3)

Sol. Average thermal energy = $\dfrac{3}{2}K_B T$

where 3 is translational degree of freedom
For monoatomic gas total degree of freedom
f = 3 (translational degree of freedom)

17. A capillary tube of radius r is immersed in water and water rises in it to a height h. The mass of the water in the capillary is 5g. Another capillary tube of radius 2r is immersed in water. The mass of water that will rise in this tube is :

(1) 20.0 g   (2) 2.5 g

(3) 5.0 g   (4) 10.0 g

Ans. (4)

Sol. $m \propto r$

$\dfrac{m_2}{m_1} = \dfrac{r_2}{r_1}$

$\dfrac{m_2}{5} = \dfrac{2r}{r}$

$m_2 = 10g$

18. The ratio of contributions made by the electric field and magnetic field components to the intensity of an electromagnetic wave is :

(c = speed of electromagnetic waves)

(1) $1 : c^2$ (2) $c : 1$

(3) $1 : 1$ (4) $1 : c$

Ans. **(3)**

Sol. In EMW, electric field and magnetic field have same energy density and same intensities.

19. Assume that light of wavelength 600 nm is coming from a star. The limit of resolution of telescope whose objective has a diameter of 2 m is :

(1) 6.00×10^{-7} rad   (2) 3.66×10^{-7} rad

(3) 1.83×10^{-7} rad   (4) 7.32×10^{-7} rad

Ans. **(2)**

Sol. Limit of resolution $= \dfrac{1.22\lambda}{a}$

$$= \dfrac{1.22 \times 6 \times 10^{-7}}{2}$$

$$= 3.66 \times 10^{-7} \text{ rad}$$

20. A wire of length L, area of cross section A is hanging from a fixed support. The length of the wire changes to L_1 when mass M is suspended from its free end. The expression for Young's modulus is :

(1) $\dfrac{MgL}{A(L_1 - L)}$ (2) $\dfrac{MgL_1}{AL}$

(3) $\dfrac{Mg(L_1 - L)}{AL}$ (4) $\dfrac{MgL}{AL_1}$

Ans. **(1)**

Sol. $Y = \dfrac{FL}{A\Delta L} = \dfrac{MgL}{A(L_1 - L)}$

21. The energy required to break one bond in DNA is 10^{-20} J. This value in eV is nearly :

(1) 0.006   (2) 6

(3) 0.6   (4) 0.06

Ans. **(4)**

Sol. $E = \dfrac{10^{-20}}{1.6 \times 10^{-19}} eV$

$= 0.625 \times 10^{-1}$

$= 0.0625 \ eV$

22. In a certain region of space with volume 0.2 m^3 the electric potential is found to be 5 V throughout. The magnitude of electric field in this region is :

(1) 5 N/C   (2) Zero

(3) 0.5 N/C   (4) 1 N/C

Ans. **(2)**

Sol. Potential is constant throughout the volume

∴ Electric field is zero.

23. The mean free path for a gas, with molecular diameter d and number density n can be expressed as :

(1) $\dfrac{1}{\sqrt{2}\, n^2 \pi^2 d^2}$ (2) $\dfrac{1}{\sqrt{2}\, n\pi d}$

(3) $\dfrac{1}{\sqrt{2}\, n\pi d^2}$ (4) $\dfrac{1}{\sqrt{2}\, n^2 \pi d^2}$

Ans. **(3)**

Sol. Mean free path for a gas sample

$$\lambda_m = \dfrac{1}{\sqrt{2}\, \pi d^2 n}$$

where d is diameter of a gas molecule and n is molecular density

24. An electron is accelerated from rest through a potential difference of V volt. If the de Broglie wavelength of the electron is 1.227×10^{-2} nm, the potential difference is :

(1) 10^4 V   (2) 10 V

(3) 10^2 V   (4) 10^3 V

Ans. **(1)**

Sol. $\lambda = 1.227 \times 10^{-2}$ nm

$= 0.1227 \ \text{Å}$

$\lambda = \dfrac{12.27}{\sqrt{v}} \text{Å}$

$0.1227 = \dfrac{12.27}{\sqrt{v}} \text{Å}$
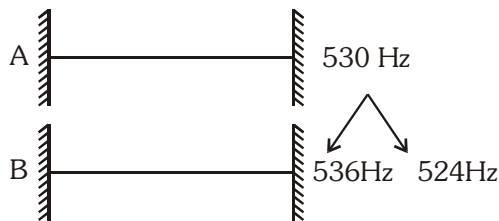
$\sqrt{v} = 10^2 \Rightarrow v = 10^4$ volt

25. In a guitar, two strings A and B made of same material are slightly out of tune and produce beats of frequency 6 Hz. When tension in B is slightly decreased, the beat frequency increases to 7 Hz. If the frequency of A is 530 Hz, the original frequency of B will be:

(1) 537 Hz   (2) 523 Hz

(3) 524 Hz   (4) 536 Hz

Ans. (3)

Sol. Guitar string i.e. string is fixed from both ends

Frequency $\propto \sqrt{\text{Tension}}$

If tension in B slightly decrease then frequency of B decrease.

If B is 536 Hz, as the frequency decreases, beats with A also decreases.

If B is 524 Hz, as the frequency decreases, beats with A increases.

∴ Original frequency of B will be 524 Hz.

26. A 40 µF capacitor is connected to a 200 V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly :

(1) 25.1 A   (2) 1.7 A

(3) 2.05 A   (4) 2.5 A

Ans. (4)

Sol. $I = \dfrac{V}{X_C} = \dfrac{V}{1/C\omega} = VC\omega$

$= 200 \times 40 \times 10^{-6} \times 2\pi \times 50$

$= 2.5$ A

27. The increase in the width of depletion region in a p-n junction diode is due to :

(1) increase in forward current

(2) forward bias only

(3) reverse bias only

(4) both forward bias and reverse bias

Ans. (3)

Sol. In reverse bias external battery attract majority charge carriers.

so width of the depletion region increase

28. The Brewsters angle i_b for an interface should be:

(1) $i_b = 90°$ (2) $0° < i_b < 30°$

(3) $30° < i_b < 45°$ (4) $45° < i_b < 90°$

Ans. (4)

Sol. $\tan i_b = \dfrac{\mu_2}{\mu_1} = \dfrac{\mu_2}{1}$

$\mu_2 > 1$

∴ $\tan i_b > 1$

∴ $90° > i_b > 45°$

29. The phase difference between displacement and acceleration of a particle in a simple harmonic motion is :

(1) Zero   (2) π rad

(3) $\dfrac{3\pi}{2}$ rad   (4) $\dfrac{\pi}{2}$ rad

Ans. (2)

Sol. Displacement (x) equation of SHM

$x = A \sin(\omega t + \phi)$ ...(1)

$\dfrac{dx}{dt} = A\omega \cos(\omega t + \phi)$

acceleration (a) $= \dfrac{d^2 x}{dt^2}$

$a = -\omega^2 A \sin \omega t + \phi$

$a = \omega^2 A \sin(\omega t + \phi + \pi)$ ...(2)

from (1) & (2), phase difference between displacement and acceleration is π.

30. A spherical conductor of radius 10 cm has a charge of 3.2×10^{-7} C distributed uniformly. What is the magnitude of electric field at a point 15 cm from the centre of the sphere ?

$\left(\dfrac{1}{4\pi \in_0} = 9 \times 10^9 \, N m^2 / C^2 \right)$

(1) 1.28×10^7 N/C

(2) 1.28×10^4 N/C

(3) 1.28×10^5 N/C

(4) 1.28×10^6 N/C

Ans. (3)

Sol. $E = \dfrac{kQ}{r^2} = \dfrac{9 \times 10^9 \times 3.2 \times 10^{-7}}{(15 \times 10^{-2})^2}$

$E = 1.28 \times 10^5$ N/C

31. The capacitance of a parallel plate capacitor with air as medium is 6 μF. With the introduction of a dielectric medium, the capacitance becomes 30 μF. The permittivity of the medium is :
($\varepsilon_0 = 8.85 \times 10^{-12}\ C^2\ N^{-1}\ m^{-2}$)
(1) $5.00\ C^2\ N^{-1}\ m^{-2}$
(2) $0.44 \times 10^{-13}\ C^2\ N^{-1}\ m^{-2}$
(3) $1.77 \times 10^{-12}\ C^2\ N^{-1}\ m^{-2}$
(4) $0.44 \times 10^{-10}\ C^2\ N^{-1}\ m^{-2}$

Ans. (4)

Sol. $C_m = \epsilon_r C_o$

$\epsilon_r = \dfrac{30}{6} = 5$

$\epsilon = \epsilon_o \cdot \epsilon_r = 8.85 \times 10^{-12} \times 5$
$\epsilon = 0.44 \times 10^{-10}$

32. Taking into account of the significant figures, what is the value of 9.99 m – 0.0099 m ?
(1) 9.9 m   (2) 9.9801 m
(3) 9.98 m   (4) 9.980 m

Ans. (3)

Sol. In subtraction the number of decimal places in the result should be equal to the number of decimal places of that term in the operation which contain lesser number of decimal places.

9.99
−0.0099
―――――
9.98 → 3 siginificant figures

33. A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage is $\dfrac{\pi}{3}$. If instead C is removed from the circuit, the phase difference is again $\dfrac{\pi}{3}$ between current and voltage. The power factor of the circuit is :
(1) −1.0   (2) zero
(3) 0.5   (4) 1.0

Ans. (4)

Sol. When L removed $\tan\phi = \dfrac{X_C}{R}$

When L removed $\tan\phi = \dfrac{X_L}{R}$

$\dfrac{X_C}{R} = \dfrac{X_L}{R} \Rightarrow$ Resonance

Z = R

$\cos\phi = \dfrac{R}{Z} = \dfrac{R}{R} = 1$

34. Dimensions of stress are :
(1) $[M\ L^{-1}\ T^{-2}]$ (2) $[M\ L\ T^{-2}]$
(3) $[M\ L^2\ T^{-2}]$ (4) $[M\ L^0\ T^{-2}]$

Ans. (1)

Sol. stress $= \dfrac{Force}{Area}$

$= \dfrac{M^1 L^1 T^{-2}}{L^2}$

stress $= M^1 L^{-1} T^{-2}$

35. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled ?
(1) zero
(2) doubled
(3) four times
(4) one-fourth

Ans. (1)

Sol. $K_1 = 1.5\ h\nu_0 - \phi_0 = 0.5\ h\nu_0$

$K_2 = \dfrac{1.5}{2} h\nu_0 - h\nu_0 = -0.25\ h\nu_0$

∵ Kinetic energy can never be negative
So, no emission and i = 0

OR

In second case the incident frequency is halved

Incident frequency $= \dfrac{1.5}{2}\nu_0 = 0.75\ \nu_0$

Now the incident frequency is less than threshold frequency so no emission of electron take place therefore no current. (i = 0)

36. The solids which have the negative temperature coefficient of resistance are :
(1) insulators and semiconductors
(2) metals
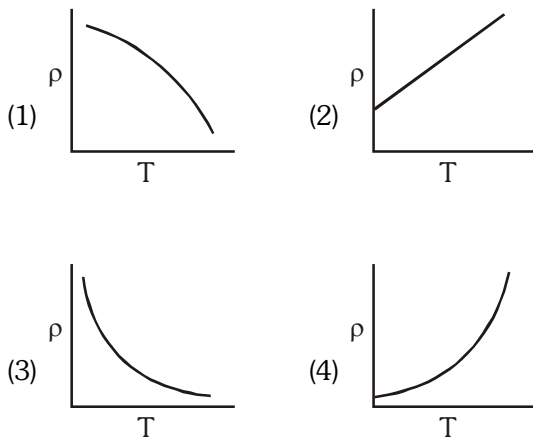(3) insulators only
(4) semiconductors only

Ans. (1)

37. A charged particle having drift velocity of $7.5 \times 10^{-4}\ ms^{-1}$ is an electric field of $3 \times 10^{-10}\ Vm^{-1}$, has a mobility in $m^2\ V^{-1}\ s^{-1}$ of :
(1) 2.25×10^{-15}
(2) 2.25×10^{15}
(3) 2.5×10^6
(4) 2.5×10^{-6}

Ans. (3)

Sol. $\mu = \dfrac{v_d}{E} = \dfrac{7.5 \times 10^{-4}}{3 \times 10^{-10}}$

$= 2.5 \times 10^6$

38. Which of the following graph represents the variation of resistivity (ρ) with temperature (T) for copper ?

(1)

(2)

(3)

(4)

Ans. (4)

Sol. For some metals like copper, resistivity is nearly proportional to temperature although a non linear region always exists at very low temperature.

39. Two bodies of mass 4kg and 6kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of the system in terms of acceleration due to gravity (g) is :

4kg

6kg
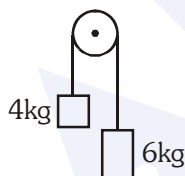
(1) g/10   (2) g

(3) g/2   (4) g/5

Ans. (4)

Sol. $a = \dfrac{(m_2 - m_1)g}{m_1 + m_2}$

$a = \dfrac{(6-4)g}{6+4} = \dfrac{2g}{10}$

$a = \dfrac{g}{5}$

40. A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale.

The pitch of the screw gauge is :

(1) 1.0 mm   (2) 0.01 mm

(3) 0.25 mm   (4) 0.5 mm

Ans. (4)

Sol. L.C. $= \dfrac{\text{Pitch}}{\text{Number of division on circular scale}}$

$\Rightarrow$ 0.01 mm $= \dfrac{\text{Pitch}}{50}$

$\Rightarrow$ Pitch = 0.5 mm

41. In Young's double slit experiment, if the separation between coherent sources is halved and the distance of the screen from the coherent sources is doubled, then the fringe width becomes :

(1) one-fourth

(2) double

(3) half

(4) four times

Ans. (4)

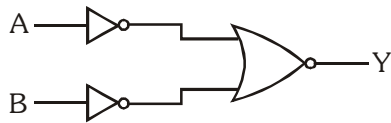**Sol.** $\beta = \dfrac{\lambda D}{d}$

$\beta' = \dfrac{\lambda D'}{d'}$

D' = 2D, d' = $\dfrac{d}{2}$

$\beta' = \dfrac{\lambda \times 2D}{d/2} = \dfrac{4\lambda D}{d}$

$\beta' = 4\beta$

Fringe with becomes 4 times

42. For the logic circuit shown, the truth table is :

(1)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

(2)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(3)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(4)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

Ans. (2)

Sol. $Y = \overline{\overline{A} + \overline{B}} = \overline{\overline{A}} . \overline{\overline{B}} = A.B$ = AND gate

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

43. The energy equivalent of 0.5 g of a substance is:
(1) 0.5×10^{13} J
(2) 4.5×10^{16} J
(3) 4.5×10^{13} J
(4) 1.5×10^{13} J

Ans. (3)

Sol. $E = mc^2$
   $= 0.5 \times 10^{-3} \times 9 \times 10^{16}$
   $= 4.5 \times 10^{13}$ J

44. For which one of the following, Bohr model in **not** valid ?
(1) Singly ionised neon atom (Ne^+)
(2) Hydrogen atom
(3) Singly ionised helium atom (He^+)
(4) Deuteron atom

Ans. (1)

Sol. Bohr model is applicable for only single electron species.

45. The quantities of heat required to raise the temperature of two solid copper spheres of radii r_1 and r_2 ($r_1 = 1.5\, r_2$) through 1 K are in the ratio:

(1) $\dfrac{5}{3}$ (2) $\dfrac{27}{8}$

(3) $\dfrac{9}{4}$ (4) $\dfrac{3}{2}$

Ans. (2)

Sol. Heat supplied $\Delta Q = Ms\Delta T$
For same material 's' same.

$\Delta Q \propto M$ and $M = \dfrac{4}{3}\pi r^3 \rho$

$\Delta Q \propto r^3$

$\dfrac{\Delta Q_1}{\Delta Q_2} = \left(\dfrac{r_1}{r_2}\right)^3 = \left(\dfrac{1.5}{1}\right)^3 = \dfrac{27}{8}$

FINAL NEET(UG)–2020 EXAMINATION
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| BIOLOGY | TEST PAPER WITH ANSWER & SOLUTIONS |

46. The transverse section of a plant shows following anatomical features:

(a) Large number of scattered vascular bundles surrounded by bundle sheath.

(b) Large conspicuous parenchymatous ground tissue.

(c) Vascular bundles conjoint and closed.

(d) Phloem parenchyma absent.

Identify the category of plant and its part :-

(1) Dicotyledonous root

(2) Monocotyledonous stem

(3) Monocotyledonous root

(4) Dicotyledonous stem

Ans. **(2)** Monocotyledonous stem

47. Which of the following would help in prevention of diuresis ?

(1) Decrease in secretion of renin by JG cells

(2) More water reabsorption due to undersecretion of ADH

(3) Reabsorption of Na^+ and water from renal tubules due to aldosterone

(4) Atrial natriuretic factor causes vasoconstriction

Ans. **(3)** Reabsorption of Na^+ and water from renal tubules due to aldosterone

48. Which of the following statements is **not correct** ?

(1) Genetically engineered insulin is produced in *E-Coli*.

(2) In man insulin is synthesised as a proinsulin.

(3) The proinsulin has an extra peptide called C-peptide.

(4) The functional insulin has A and B chains linked together by hydrogen bonds.

Ans. **(4)** The functional insulin has A and B chains linked together by hydrogen bonds.

49. Embryological support for evolution was disapproved by :

(1) Oparin

(2) Karl Ernst von Baer

(3) Alfred Wallace

(4) Charles Darwin

Ans. **(2)** Karl Ernst von Baer

50. Goblet cells of alimentary canal are modified from :

(1) Compound epithelial cells

(2) Squamous epithelial cells

(3) Columnar epithelial cells

(4) Chondrocytes

Ans. **(3)** Columnar epithelial cells

51. The QRS complex in a standard ECG represents:

(1) Repolarisation of ventricles

(2) Repolarisation of auricles

(3) Depolarisation of auricles

(4) Depolarisation of ventricles

Ans. **(4)** Depolarisation of ventricles

52. In light reaction, plastoquinone facilitates the transfer of electrons from :

(1) PS-I to ATP synthase

(2) PS-II to $Cytb_6f$ complex

(3) $Cytb_6f$ complex to PS-I

(4) PS-I to $NADP^+$

Ans. **(2)** PS-II to $Cytb_6f$ complex

53. The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is/are :

(1) Ammonia and hydrogen

(2) Ammonia alone

(3) Nitrate alone

(4) Ammonia and oxygen

Ans. **(1)** Ammonia and hydrogen

54. Match the following with respect to meiosis:

(a) Zygotene	(i) Terminalization
(b) Pachytene	(ii) Chiasmata
(c) Diplotene	(iii) Crossing over
(d) Diakinesis	(iv) Synapsis

Select the **correct** option from the following:

	(a)	(b)	(c)	(d)
(1)	(ii)	(iv)	(iii)	(i)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(i)	(ii)	(iv)	(iii)

Ans. **(3)** (iv) (iii) (ii) (i)

55. Match the following columns and select the **correct** option.

Column -I	Column -II
(a) 6 -15 pairs of gill slits	(i) Trygon
(b) Heterocercal caudal fin	(ii) Cyclostomes
(c) Air Bladder	(iii) Chondrichthyes
(d) Poison sting	(iv) Osteichthyes

	(a)	(b)	(c)	(d)
(1)	(i)	(iv)	(iii)	(ii)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iv)	(ii)	(iii)	(i)

Ans. (2) (ii)   (iii)   (iv)   (i)

56. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells ?

(1) Polysomes

(2) Endoplasmic reticulum

(3) Peroxisomes

(4) Golgi bodies

Ans. (4) Golgi bodies

57. Match the organism with its use in biotechnology.

(a) *Bacillus thuringiensis*	(i) Cloning vector
(b) *Thermus aquaticus*	(ii) Construction of first rDNA molecule
(c) *Agrobacterium tumefaciens*	(iii) DNA polymerase
(d) *Salmonella typhimurium*	(iv) Cry proteins

Select the **correct** option from the following:

	(a)	(b)	(c)	(d)
(1)	(iii)	(iv)	(i)	(ii)
(2)	(ii)	(iv)	(iii)	(i)
(3)	(iv)	(iii)	(i)	(ii)
(4)	(iii)	(ii)	(iv)	(i)

Ans. (3) (iv)   (iii)   (i)   (ii)

58. Experimental verification of the chromosomal theory of inheritance was done by:

(1) Morgan   (2) Mendel

(3) Sutton   (4) Boveri

Ans. (1) Morgan

59. Match the following :

(a) Inhibitor of catalytic activity	(i) Ricin
(b) Possess peptide bonds	(ii) Malonate
(c) Cell wall material in fungi	(iii) Chitin
(d) Secondary metabolite	(iv) Collagen

Choose the **correct** option from the following :

	(a)	(b)	(c)	(d)
(1)	(ii)	(iii)	(i)	(iv)
(2)	(ii)	(iv)	(iii)	(i)
(3)	(iii)	(i)	(iv)	(ii)
(4)	(iii)	(iv)	(i)	(ii)

Ans. (2) (ii)   (iv)   (iii)   (i)

60. Bilaterally symmetrical and acoelomate animals are exemplified by:

(1) Annelida

(2) Ctenophora

(3) Platyhelminthes

(4) Aschelminthes

Ans. (3) Platyhelminthes

61. Floridean starch has structure similar to:

(1) Laminarin and cellulose

(2) Starch and cellulose

(3) Amylopectin and glycogen

(4) Mannitol and algin

Ans. (3) Amylopectin and glycogen

62. Identify the **correct** statement with regard to G_1 phase (Gap 1) of interphase.

(1) Nuclear Division takes place.

(2) DNA synthesis or replication takes place.

(3) Reorganisation of all cell components takes place.

(4) Cell is metabolically active, grows but does not replicate its DNA.

Ans. (4) Cell is metabolically active, grows but does not replicate its DNA.

63. If the head of cockroach is removed, it may live for few days because:

(1) the head holds a $1/3^{rd}$ of a nervous system while the rest is situated along the dorsal part of its body.

(2) the supra-oesophageal ganglia of the cockroach are situated in ventral part of abdomen.

(3) the cockroach does not have nervous system.

(4) the head holds a small proportion of a nervous system while the rest is situated along the ventral part of its body.

Ans. **(4)** the head holds a small proportion of a nervous system while the rest is situated along the ventral part of its body.

64. The enzyme enterokinase helps in conversion of :

(1) pepsinogen into pepsin

(2) protein into polypeptides

(3) trypsinogen into trypsin

(4) caseinogen into casein

Ans. **(3)** trypsinogen into trypsin

65. Match the following columns and select the **correct** option.

Column -I	Column - II
(a) Organ of Corti	(i) Connects middle ear and pharynx
(b) Cochlea	(ii) Coiled part of the labyrinth
(c) Eustachian tube	(iii) Attached to the oval window
(d) Stapes	(iv) Located on the basilar membrane

	(a)	(b)	(c)	(d)
(1)	(i)	(ii)	(iv)	(iii)
(2)	(ii)	(iii)	(i)	(iv)
(3)	(iii)	(i)	(iv)	(ii)
(4)	(iv)	(ii)	(i)	(iii)

Ans. **(4)** (iv) (ii) (i) (iii)

66. Identify the wrong statement with reference to transport of oxygen.

(1) Low pCO_2 in alveoli favours the formation of oxyhaemoglobin.

(2) Binding of oxygen with haemoglobin is mainly related to partial pressure of O_2.

(3) Partial pressure of CO_2 can interfere with O_2 binding with haemoglobin.

(4) Higher H^+ conc. in alveoli favours the formation of oxyhaemoglobin.

Ans. **(4)** Higher H^+ conc. in alveoli favours the formation of oxyhaemoglobin.

67. In water hyacinth and water lily, pollination takes place by :

(1) insects and water

(2) insects or wind

(3) water currents only

(4) wind and water

Ans. **(2)** insects or wind

68. Bt cotton variety that was developed by the introduction of toxin gene of *Bacillus thuringiensis* (Bt) is resistant to :

(1) Insect predators

(2) Insect pests

(3) Fungal diseases

(4) Plant nematodes

Ans. **(2)** Insect pests

69. Select the correct statement.

(1) Insulin is associated with hyperglycemia.

(2) Glucocorticoids stimulate gluconeogenesis.

(3) Glucagon is associated with hypoglycemia.

(4) Insulin acts on pancreatic cells and adipocytes.

Ans. **(2)** Glucocorticoids stimulate gluconeogenesis.

70. Identify the basic amino acid from the following.

(1) Valine   (2) Tyrosine

(3) Glutamic Acid   (4) Lysine

Ans. **(4)** Lysine

71. Flippers of Penguins and Dolphins are examples of:

(1) Natural selection

(2) Adaptive radiation

(3) Convergent evolution

(4) Industrial melanism

Ans. **(3)** Convergent evolution

72. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask :

(1) CH_3, H_2, NH_3 and water vapor at 600℃

(2) CH_4, H_2, NH_3 and water vapor at 800℃

(3) CH_3, H_2, NH_4 and water vapor at 800℃

(4) CH_4, H_2, NH_3 and water vapor at 600℃

Ans. **(2)** CH_4, H_2, NH_3 and water vapor at 800℃

73. The specific palindromic sequence which is recognized by EcoRI is :

(1) 5' - GGATCC - 3'
 3' - CCTAGG - 5'

(2) 5' - GAATTC - 3'
 3' - CTTAAG - 5'

(3) 5' - GGAACC - 3'
 3' - CCTTGG - 5'

(4) 5' - CTTAAG - 3'
 3' - GAATTC - 5'

Ans. (2) 5' - GAATTC - 3'
 3' - CTTAAG - 5'

74. Secondary metabolites such as nicotine, strychnine and caffeine are produced by plants for their :

(1) Effect on reproduction

(2) Nutritive value

(3) Growth response

(4) Defence action

Ans. (4) Defence action

75. Presence of which of the following conditions in urine are indicative of Diabetes Mellitus ?

(1) Renal calculi and Hyperglycaemia

(2) Uremia and Ketonuria

(3) Uremia and Renal Calculi

(4) Ketonuria and Glycosuria

Ans. (4) Ketonuria and Glycosuria

76. Which of the following statements are true for the phylum-Chordata ?

(a) In Urochordata notochord extends from head to tail and it is present throughout their life.

(b) In Vertebrata notochord is present during the embryonic period only.

(c) Central nervous system is dorsal and hollow.

(d) Chordata is divided into 3 subphyla :
 Hemichordata, Tunicata and Cephalochordata.

(1) (b) and (c)

(2) (d) and (c)

(3) (c) and (a)

(4) (a) and (b)

Ans. (1) (b) and (c)

77. Cuboidal epithelium with brush border of microvilli is found in :

(1) eustachian tube

(2) lining of intestine

(3) ducts of salivary glands

(4) proximal convoluted tubule of nephron

Ans. (4) proximal convoluted tubule of nephron

78. Match the following columns and select the correct option.

	Column - I		Column - II
(a)	*Clostridium butylicum*	(i)	Cyclosporin - A
(b)	*Trichoderma polysporum*	(ii)	Butyric Acid
(c)	*Monascus purpureus*	(iii)	Citric Acid
(d)	*Aspergillus niger*	(iv)	Blood cholesterol lowering agent

	(a)	(b)	(c)	(d)
(1)	(iv)	(iii)	(ii)	(i)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(i)	(ii)	(iv)	(iii)

Ans. (3) (ii) (i) (iv) (iii)

79. Which of the following is correct about viroids ?

(1) They have free DNA without protein coat.

(2) They have RNA with protein coat.

(3) They have free RNA without protein coat.

(4) They have DNA with protein coat.

Ans. (3) They have free RNA without protein coat.

80. The body of the ovule is fused within the funicle at:

(1) Chalaza (2) Hilum

(3) Micropyle (4) Nucellus

Ans. (2) Hilum

81. The oxygenation activity of RuBisCo enzyme in photorespiration leads to the formation of :

(1) 1 molecule of 4-C compound and 1 molecule of 2-C compound.

(2) 2 molecules of 3-C compound

(3) 1 molecule of 3-C compound

(4) 1 molecule of 6-C compound

Ans. (3) 1 molecule of 3-C compound

82. Match the following columns and select the correct option.

Column - I	Column - II
(a) Eosinophils	(i) Immune response
(b) Basophils	(ii) Phagocytosis
(c) Neutrophils	(iii) Release histaminase, destructive enzymes
(d) Lymphocytes	(iv) Release granules containing histamine

	(a)	(b)	(c)	(d)
(1)	(ii)	(i)	(iii)	(iv)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(i)	(ii)	(iv)	(iii)

Ans. (2) (iii)   (iv)   (ii)   (i)

83. Which of the following hormone levels will cause release of ovum (ovulation) from the graffian follicle?
(1) Low concentration of FSH
(2) High concentration of Estrogen
(3) High concentration of Progesterone
(4) Low concentration of LH

Ans. (2) High concentration of Estrogen

84. Select the correct events that occur during inspiration.
(a) Contraction of diaphragm
(b) Contraction of external inter-costal muscles
(c) Pulmonary volume decreases
(d) Intra pulmonary pressure increases
(1) only (d)
(2) (a) and (b)
(3) (c) and (d)
(4) (a), (b) and (d)

Ans. (2) (a) and (b)

85. In which of the following techniques, the embryos are transferred to assist those females who cannot conceive?
(1) GIFT and ICSI
(2) ZIFT and IUT
(3) GIFT and ZIFT
(4) ICSI and ZIFT

Ans. (2) ZIFT and IUT

86. The infectious stage of *Plasmodium* that enters the human body is :
(1) Male gametocytes
(2) Trophozoites
(3) Sporozoites
(4) Female gametocytes

Ans. (3) Sporozoites

87. Match the following columns and select the **correct** option.

Column-I	Column-II
(a) Placenta	(i) Androgens
(b) Zona pellucida	(ii) Human Chorionic Gonadotropin (hCG)
(c) Bulbo-urethral glands	(iii) Layer of the ovum
(d) Leydig cells	(iv) Lubrication of the Penis

	(a)	(b)	(c)	(d)
(1)	(ii)	(iii)	(iv)	(i)
(2)	(iv)	(iii)	(i)	(ii)
(3)	(i)	(iv)	(ii)	(iii)
(4)	(iii)	(ii)	(iv)	(i)

Ans. (1) (ii)   (iii)   (iv)   (i)

88. Select the **correct** match.
(1) Thalassemia - X linked
(2) Haemophilia - Y linked
(3) Phenylketonuria - Autosomal dominant trait
(4) Sickle cell anaemia - Autosomal recessive trait, chromosome-11

Ans. (4) Sickle cell anaemia - Autosomal recessive trait, chromosome-11

89. Which of the following statements is **correct** ?
(1) Adenine does not pair with thymine
(2) Adenine pairs with thymine through two H-bonds
(3) Adenine pairs with thymine through one H-bond
(4) Adenine pairs with thymine through three H-bonds

Ans. (2) Adenine pairs with thymine through two H-bonds

90. Which of the following is the most abundant protein in the animals ?
(1) Insulin
(2) Haemoglobin
(3) Collagen
(4) Lectin

Ans. (3) Collagen

91. Which of the following pairs is of unicellular algae?
(1) *Chlorella* and *Spirulina*
(2) *Laminaria* and *Sargassum*
(3) *Gelidium* and *Gracilaria*
(4) *Anabaena* and *Volvox*

Ans. (1) *Chlorella* and *Spirulina*

92. The plant parts which consist of two generations one within the other :

(a) Pollen grains inside the anther

(b) Germinated pollen grain with two male gametes

(c) Seed inside the fruit

(d) Embryo sac inside the ovule

(1) (a) and (d)　　　　(2) (a) only

(3) (a), (b) and (c)　　(4) (c) and (d)

Ans. (1) (a) and (d)

93. Identify the **incorrect** statement.

(1) Due to deposition of tannins, resins, oils etc., heart wood is dark in colour

(2) Heart wood does not conduct water but gives mechanical support

(3) Sapwood is involved in conduction of water and minerals from root to leaf

(4) Sapwood is the innermost secondary xylem and is lighter in colour

Ans. (4) Sapwood is the innermost secondary xylem and is lighter in colour

94. By which method was a new breed 'Hisardale' of sheep formed by using Bikaneri ewes and Marino rams ?

(1) Inbreeding

(2) Out crossing

(3) Mutational breeding

(4) Cross breeding

Ans. (4) Cross breeding

95. Some dividing cells exit the cell cycle and enter vegetative inactive stage. This is called quiescent stage (G_0). This process occurs at the end of :

(1) G_2 phase　　　(2) M phase

(3) G_1 phase　　　(4) S phase

Ans. (2) M phase / **(3)** G_1 phase

96. Identify the **correct** statement with reference to human digestive system.

(1) Vermiform appendix arises from duodenum

(2) Ileum opens into small intestine

(3) Serosa is the innermost layer of the alimentary canal

(4) Ileum is highly coiled part

Ans. (4) Ileum is highly coiled part

97. Which of the following refer to **correct** example(s) of organisms which have evolved due to changes in environment brought about by anthropogenic action?

(a) Darwin's Finches of Galapagos islands.

(b) Herbicide resistant weeds.

(c) Drug resistant eukaryotes.

(d) Man-created breeds of domesticated animals like dogs.

(1) Only (d)　　　　(2) Only (a)

(3) (a) and (c)　　　(4) (b), (c) and (d)

Ans. (4) (b), (c) and (d)

98. Match the following columns and select the **correct** option :

	Column-I	Column-II
(a)	Pituitary gland	(i) Grave's disease
(b)	Thyroid gland	(ii) Diabetes mellitus
(c)	Adrenal gland	(iii) Diabetes insipidus
(d)	Pancreas	(iv) Addision's disease

	(a)	(b)	(c)	(d)
(1)	(ii)	(i)	(iv)	(iii)
(2)	(iv)	(iii)	(i)	(ii)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(iii)	(i)	(iv)	(ii)

Ans. (4) (iii) (i) (iv) (ii)

99. Select the option including all sexually transmitted diseases.

(1) Cancer, AIDS, Syphilis

(2) Gonorrhoea, Syphilis, Genital herpes

(3) Gonorrhoea, Malaria, Gential herpes

(4) AIDS, Malaria, Filaria

Ans. (2) Gonorrhoea, Syphilis, Genital herpes

100. The number of substrate level phosphorylations in one turn of citric acid cycle is :

(1) Three　(2) Zero　(3) One　(4) Two

Ans. (3) One

101. Montreal protocol was signed in 1987 for control of :

(1) Disposal of e-wastes

(2) Transport of Genetically modified organisms from one country to another

(3) Emission of ozone depleting substances

(4) Release of Green House gases

Ans. (3) Emission of ozone depleting substances

102. Match the following concerning essential elements and their functions in plants :

(a) Iron   (i) Photolysis of water

(b) Zinc   (ii) Pollen germination

(c) Boron   (iii) Required for chlorophyll biosynthesis

(d) Manganese   (iv) IAA biosynthesis

Select the **correct** option :

	(a)	(b)	(c)	(d)
(1)	(iv)	(i)	(ii)	(iii)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(iii)	(iv)	(ii)	(i)

Ans. (4) (iii)   (iv)   (ii)   (i)

103. Match the following columns and select the **correct** option.

Column-I	Column-II
(a) Gregarious, polyphagous pest	(i) *Asterias*
(b) Adult with radial symmetry and larva with bilateral symmetry	(ii) Scorpion
(c) Book lungs	(iii) *Ctenoplana*
(d) Bioluminescence	(iv) *Locusta*

	(a)	(b)	(c)	(d)
(1)	(ii)	(i)	(iii)	(iv)
(2)	(i)	(iii)	(ii)	(iv)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(iii)	(ii)	(i)	(iv)

Ans. (3) (iv)   (i)   (ii)   (iii)

104. According to Robert May, the global species diversity is about :

(1) 7 million   (2) 1.5 million

(3) 20 million   (4) 50 million

Ans. (1) 7 million

105. Ray florets have :

(1) Half inferior ovary

(2) Inferior ovary

(3) Superior ovary

(4) Hypogynous ovary

Ans. (2) Inferior ovary

106. If the distance between two consecutive base pairs is 0.34 nm and the total number of base pairs of a DNA double helix in a typical mammalian cell is 6.6×10^9 bp, then the length of the DNA is approximately :

(1) 2.7 meters   (2) 2.0 meters

(3) 2.5 meters   (4) 2.2 meters

Ans. (4) 2.2 meters

107. Match the following columns and select the **correct** option.

Column - I	Column - II
(a) Bt cotton	(i) Gene therapy
(b) Adenosine deaminase deficiency	(ii) Cellular defence
(c) RNAi	(iii) Detection of HIV infection
(d) PCR	(iv) *Bacillus thuringiensis*

	(a)	(b)	(c)	(d)
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iv)	(i)	(ii)	(iii)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(ii)	(iii)	(iv)	(i)

Ans. (2) (iv)   (i)   (ii)   (iii)

108. Match the trophic levels with their **correct** species examples in grassland ecosystem.

(a) Fourth trophic level   (i)   Crow

(b) Second trophic level   (ii)   Vulture

(c) First trophic level   (iii)   Rabbit

(d) Third trophic level   (iv)   Grass

Select the **correct** option :

	(a)	(b)	(c)	(d)
(1)	(i)	(ii)	(iii)	(iv)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(iv)	(iii)	(ii)	(i)

Ans. (2) (ii)   (iii)   (iv)   (i)

109. Match the following diseases with the causative organism and select the **correct** option.

Column - I	Column - II
(a) Typhoid	(i) *Wuchereria*
(b) Pneumonia	(ii) *Plasmodium*
(c) Filariasis	(iii) *Salmonella*
(d) Malaria	(iv) *Haemophilus*

	(a)	(b)	(c)	(d)
(1)	(iv)	(i)	(ii)	(iii)
(2)	(i)	(iii)	(ii)	(iv)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(ii)	(i)	(iii)	(iv)

Ans. (3) (iii)   (iv)   (i)   (ii)

110. The roots that originate from the base of the stem are :

(1) Lateral roots   (2) Fibrous roots

(3) Primary roots   (4) Prop roots

Ans. (2) Fibrous roots

111. Meiotic division of the secondary oocyte is completed :

(1) At the time of fusion of a sperm with an ovum

(2) Prior to ovulation

(3) At the time of copulation

(4) After zygote formation

Ans. (1) At the time of fusion of a sperm with an ovum

112. Identify the **wrong** statement with regard to Restriction Enzymes.

(1) Sticky ends can be joined by using DNA ligases.

(2) Each restriction enzyme functions by inspecting the length of a DNA sequence.

(3) They cut the strand of DNA at palindromic sites.

(4) They are useful in genetic engineering.

Ans. (1) Sticky ends can be joined by using DNA ligases.

113. In relation to Gross primary productivity and Net primary productivity of an ecosystem, which one of the following statements is **correct** ?

(1) There is no relationship between Gross primary productivity and Net primary productivity.

(2) Gross primary productivity is always less than net primary productivity.

(3) Gross primary productivity is always more than net primary productivity.

(4) Gross primary productivity and Net primary productivity are one and same.

Ans. (3) Gross primary productivity is always more than net primary productivity.

114. The process of growth is maximum during :

(1) Dormancy   (2) Log phase

(3) Lag phase   (4) Senescence

Ans. (2) Log phase

115. The sequence that controls the copy number of the linked DNA in the vector, is termed :

(1) Recognition site

(2) Selectable marker

(3) Ori site

(4) Palindromic sequence

Ans. (3) Ori site

116. Name the enzyme that facilitates opening of DNA helix during transcription.

(1) RNA polymerase

(2) DNA ligase

(3) DNA helicase

(4) DNA polymerase

Ans. (1) RNA polymerase

117. Snow-blindness in Antarctic region is due to :
(1) Damage to retina caused by infra-red rays
(2) Freezing of fluids in the eye by low temperature
(3) Inflammation of cornea due to high dose of UV-B radiation
(4) High reflection of light from snow
Ans. (3) Inflammation of cornea due to high dose of UV-B radiation

118. Strobili or cones are found in :
(1) *Equisetum* (2) *Salvinia*
(3) *Pteris* (4) *Marchantia*
Ans. (1) *Equisetum*

119. Match the following columns and select the **correct** option.

	Column - I		Column - II
(a)	Floating Ribs	(i)	Located between second and seventh ribs
(b)	Acromion	(ii)	Head of the Humerus
(c)	Scapula	(iii)	Clavicle
(d)	Glenoid cavity	(iv)	Do not connect with the sternum

	(a)	(b)	(c)	(d)
(1)	(iv)	(iii)	(i)	(ii)
(2)	(ii)	(iv)	(i)	(iii)
(3)	(i)	(iii)	(ii)	(iv)
(4)	(iii)	(ii)	(iv)	(i)

Ans. (1) (iv) (iii) (i) (ii)

120. Which of the following is put into Anaerobic sludge digester for further sewage treatment ?
(1) Activated sludge
(2) Primary sludge
(3) Floating debris
(4) Effluents of primary treatment
Ans. (1) Activated sludge

121. Identify the wrong statement with reference to the gene 'I' that controls ABO blood groups.
(1) Allele 'i' does not produce any sugar.
(2) The gene (I) has three alleles.
(3) A person will have only two of the three alleles.
(4) When I^A and I^B are present together, they express same type of sugar.
Ans. (4) When I^A and I^B are present together, they express same type of sugar.

122. The ovary is half inferior in :
(1) Plum (2) Brinjal
(3) Mustard (4) Sunflower
**Ans. (1)** Plum

123. The first phase of translation is :
(1) Recognition of an anti-codon
(2) Binding of mRNA to ribosome
(3) Recognition of DNA molecule
(4) Aminoacylation of tRNA
Ans. (4) Aminoacylation of tRNA

124. In gel electrophoresis, separated DNA fragments can be visualized with the help of :
(1) Ethidium bromide in infrared radiation
(2) Acetocarmine in bright blue light
(3) Ethidium bromide in UV radiation
(4) Acetocarmine in UV radiation
Ans. (3) Ethidium bromide in UV radiation

125. Dissolution of the synaptonemal complex occurs during :
(1) Leptotene (2) Pachytene
(3) Zygotene (4) Diplotene
Ans. (4) Diplotene

126. Identify the substances having glycosidic bond and peptide bond, respectively in their structure :
(1) Inulin, insulin (2) Chitin, Cholesterol
(3) Glycerol, trypsin (4) Cellulose, lecithin
Ans. (1) Inulin, insulin

127. Name the plant growth regulator which upon spraying on sugarcane crop, increases the length of stem, thus increasing the yield of sugarcane crop.
(1) Abscisic acid (2) Cytokinin
(3) Gibberellin (4) Ethylene
Ans. (3) Gibberellin

128. Which of the following statements about inclusion bodies is **incorrect** ?
(1) These represent reserve material in cytoplasm.
(2) They are not bound by any membrane.
(3) These are involved in ingestion of food particles.
(4) They lie free in the cytoplasm.
Ans. (3) These are involved in ingestion of food particles.

129. Which of the following regions of the globe exhibits highest species diversity?
(1) Amazon forests
(2) Western Ghats of India
(3) Madagascar
(4) Himalayas
Ans. (1) Amazon forests

130. How many true breeding pea plant varieties did Mendel select as pairs, which were similar except in one character with contrasting traits?

(1) 8   (2) 4   (3) 2   (4) 14

Ans. (4) 14

131. Identify the **wrong** statement with reference to immunity.

(1) Foetus receives some antibodies from mother, it is an example for passive immunity.

(2) When exposed to antigen (living or dead) antibodies are produced in the host's body. It is called "Active immunity".

(3) When ready-made antobodies are directly given, it is called "Passive immunity".

(4) Active immunity is quick and gives full response.

Ans. (4) Active immunity is quick and gives full response.

132. Which of the following is **not** an attribute of a population?

(1) Species interaction

(2) Sex ratio

(3) Natality

(4) Mortality

Ans. (1) Species interaction

133. Choose the **correct** pair from the following :

(1) Exonucleases : Make cuts at specific positions within DNA

(2) Ligases : Join the two DNA molecules

(3) Polymerases : Break the DNA into fragments

(4) Nucleases : Separate the two strands of DNA

Ans. (2) Ligases : Join the two DNA molecules

134. The process reponsible for facilitating loss of water in liquid form from the tip of grasss blades at night and in early morning is :

(1) Plasmolysis   (2) Transpiration

(3) Root pressure   (4) Imbibition

Ans. (3) Root pressure

135. Which of the following is **not** an inhibitory substance governing seed dormancy?

(1) Para-ascorbic acid

(2) Gibberellic acid

(3) Abscisic acid

(4) Phenolic acid

Ans. (2) Gibberellic acid

FINAL NEET(UG)–2020 EXAMINATION
(Held On Sunday 13th SEPTEMBER, 2020)

CHEMISTRY	TEST PAPER WITH ANSWER & SOLUTION

136. Match the following and identify the correct option.

(a) $CO(g) + H_2(g)$ (i) $Mg(HCO_3)_2 + Ca(HCO_3)_2$

(b) Temporary hardness of water   (ii) An electron deficient hydride

(c) B_2H_6 (iii) Synthesis gas

(d) H_2O_2 (iv) Non-planar structure

	(a)	(b)	(c)	(d)
(1)	(i)	(iii)	(ii)	(iv)
(2)	(iii)	(i)	(ii)	(iv)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(iii)	(iv)	(ii)	(i)

Ans. (2)

Sol. (a) $CO + H_2$ ... (iii) synthesis gas

(b) Temporary Hardness ... (i) $Mg(HCO_3)_2$ and $Ca(HCO_3)_2$

(c) B_2H_6 ... (ii) Electron deficient ($6e^-$)

(d) H_2O_2 ... (iv) Non-planar structure
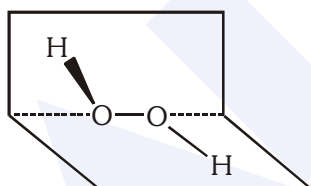
137. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following ?

(1) Hyperconjugation

(2) –I effect of –CH_3 groups

(3) +R effect of –CH_3 groups

(4) –R effect of –CH_3 groups

Ans. (1)

Sol.
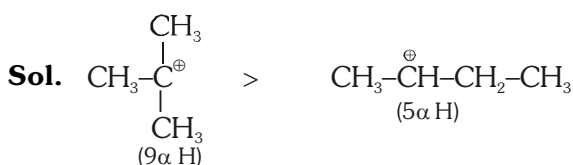
Tert. Butyl Carbocation   Sec. Butyl carbocation

↓

More stable due to Hyperconjugation effect.

138. What is the change in oxidation number of carbon in the following reaction ?

$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$
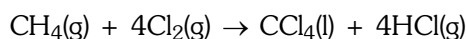
(1) 0 to –4   (2) +4 to +4

(3) 0 to +4   (4) –4 to +4

Ans. (4)

Sol. $CH_{4(g)} + 4Cl_{2(g)} \rightarrow CCl_{4(\ell)} + 4HCl_{(g)}$

$\underline{C}H_4$(–4)

$\underline{C}Cl_4$(+4)
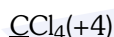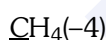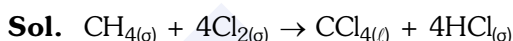
–4 to + 4

139. Sucrose on hydrolysis gives :

(1) α-D-Fructose + β-D-Fructose

(2) β-D-Glucose + α-D-Fructose

(3) α-D-Glucose + β-D-Glucose

(4) α-D-Glucose + β-D-Fructose

Ans. (4)

Sol. Sucrose $\xrightarrow[\text{(Hydrolysis)}]{H_3O^+}$ α-D-Glucose + β-D-Fructose
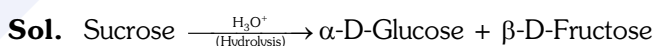
140. The calculated spin only magnetic moment of Cr^{2+} ion is :

(1) 2.84 BM   (2) 3.87 BM

(3) 4.90 BM   (4) 5.92 BM

Ans. (3)

Sol. $Cr^{+2} = 3d^4$

n=4
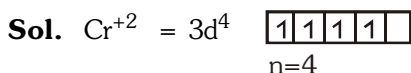
$\mu = \sqrt{n(n+2)}$ B.M. $= \sqrt{4(6)} = \sqrt{24}$ B.M.

= 4.90 B.M.

141. Identify a molecule which does not exist.

(1) O_2 (2) He_2 (3) Li_2 (4) C_2
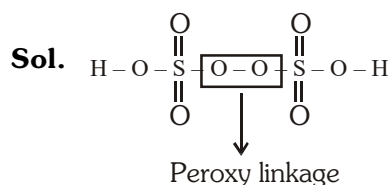
Ans. (2)

Sol. He_2 = Total electron = 4

$= \sigma_{1\sigma}^2 \, \sigma_{1\sigma}^{*2} \Rightarrow$ B.O. $= \frac{1}{2}[Nb - Na] = \frac{1}{2}[2 - 2] = 0$

Bond order = 0, so He_2 does not exist.

142. Which of the following oxoacid of sulphur has –O–O– linkage ?

(1) $H_2S_2O_7$, pyrosulphuric acid

(2) H_2SO_3, sulphurous acid

(3) H_2SO_4, sulphuric acid

(4) $H_2S_2O_8$, peroxodisulphuric acid

Ans. **(4)**

Sol.

$$H-O-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-\boxed{O-O}-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O-H$$

Peroxy linkage

143. Which of the following is the correct order of increasing field strength of ligands to form coordination compounds ?

(1) $CN^- < C_2O_4^{2-} < SCN^- < F^-$

(2) $SCN^- < F^- < C_2O_4^{2-} < CN^-$

(3) $SCN^- < F^- < CN^- < C_2O_4^{2-}$

(4) $F^- < SCN^- < C_2O_4^{2-} < CN^-$

Ans. **(2)**

Sol. According to spectrochemical series.

144. The number of Faradays(F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is :

(1) 4   (2) 1   (3) 2   (4) 3

Ans. **(2)**

Sol. $Ca^{+2} + 2e^- \rightarrow Ca_{(s)}$
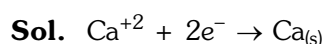
v.f. = 2

As per faraday's 1st law

Charge passed in faraday = g.eq of product

$$= \frac{20}{40} \times 2 = 1F$$

145. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :

(1) Isobutyl alcohol

(2) Isopropyl alcohol

(3) Sec. butyl alcohol

(4) Tert. butyl alcohol

Ans. **(4)**

Sol.

$$CH_3-\overset{\overset{}{\underset{\underset{O}{\|}}{C}}}{}-CH_3 \xrightarrow{CH_3-MgCl} CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{\overset{-}{O}\ \overset{+}{M}gCl}{|}}{C}}-CH_3 \xrightarrow{H_2O}$$

$$CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{OH}{|}}{C}}-CH_3 \text{ (Tert. butyl alcohol)}$$
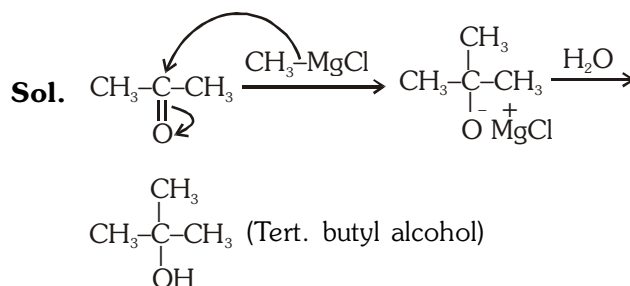
146. Which of the following is a cationic detergent ?

(1) Sodium dodecylbenzene sulphonate

(2) Sodium lauryl sulphate

(3) Sodium stearate

(4) Cetyltrimethyl ammonium bromide

Ans. **(4)**

Sol. $C_{19}H_{42}N^+Br^-$ (cationic detergent)

12th NCERT (16.5.2)

Synthetic detergents

147. Identify the incorrect statement.

(1) The oxidation states of chromium in CrO_4^{2-} and $Cr_2O_7^{2-}$ are not the same

(2) Cr^{2+} (d^4) is a stronger reducing agent than Fe^{2+}(d^6) in water.

(3) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.

(4) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

Ans. **(1)**

Sol. Chromate $(CrO_4^{-2}) \Rightarrow$ oxidation state = + 6

dichromate $(Cr_2O_7^{-2}) \Rightarrow$ oxidation state = + 6

oxidation state are same.

148. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

(1) n-Butane

(2) n-Hexane

(3) 2,3-Dimethylbutane
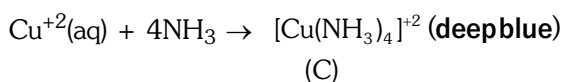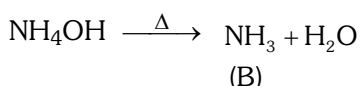
(4) n-Heptane

Ans. **(4)**

Sol. n-Heptane can not be made in good yield using Wurtz reaction since it is unsymmetrical alkane.

149. Urea reacts with water to form A which will decompose to form B. B when passed through Cu^{2+} (aq), deep blue colour solution C is formed. What is the formula of C from the following ?

(1) $CuCO_3 \cdot Cu(OH)_2$ (2) $CuSO_4$

(3) $[Cu(NH_3)_4]^{2+}$ (4) $Cu(OH)_2$

Ans. (3)

Sol. $NH_2CONH_2 + H_2O \rightarrow CO_2 + \underset{(A)}{NH_4OH}$

$$\underset{(B)}{NH_4OH} \xrightarrow{\Delta} NH_3 + H_2O$$

$$Cu^{+2}(aq) + 4NH_3 \rightarrow \underset{(C)}{[Cu(NH_3)_4]^{+2}} \textbf{(deep blue)}$$

150. The freezing point depression constant (K_f) of benzene is 5.12 K kg mol^{-1}. The freezing point depression for the solution of molality 0.078 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :

(1) 0.60 K   (2) 0.20 K   (3) 0.80 K   (4) 0.40 K

Ans. (4)

Sol. $\Delta T_f = K_f \times m$

$\qquad = 5.12 \times 0.078$

$\Delta T_f = 0.40$ K

151. The number of protons, neutrons and electrons in $^{175}_{71}Lu$, respectively, are :

(1) 175, 104 and 71   (2) 71, 104 and 71

(3) 104, 71 and 71   (4) 71, 71 and 104

Ans. (2)

Sol. $^{175}_{71}Lu$

$p^+ = 71$

$n^0 = 175 - 71 = 104$

$e^- = 71$

152. Identify compound X in the following sequence of reactions :
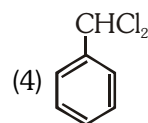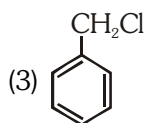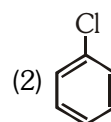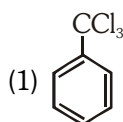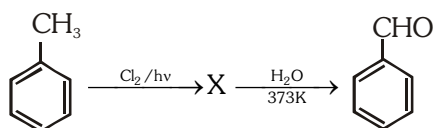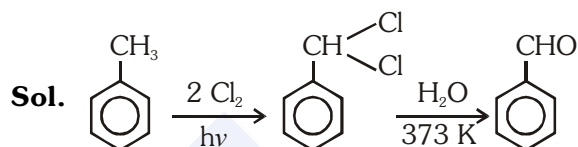
153. Identify the **correct** statement from the following:

(1) Pig iron can be moulded into a variety of shapes.

(2) Wrought iron is impure iron with 4% carbon.

(3) Blister copper has blistered appearance due to evolution of CO_2.

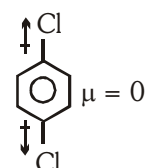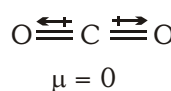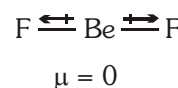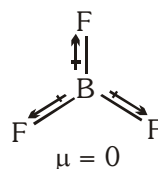(4) Vapour phase refining is carried out for Nickel by Van Arkel method.

Ans. (1)

Sol. Pig iron contains impurities (C, S, Si, P etc) having malleable nature that's why can be moulded.

154. Which of the following set of molecules will have zero dipole moment ?

(1) Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene

(2) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene

(3) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene

(4) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

Ans. (1)

Sol. BF_3, BeF_2, CO_2 & 1, 4 - dichloro benzene all are symmetrical structure.

The answer options (1)-(4) for Q152/153:

(1) benzene ring with CCl_3

(2) benzene ring with Cl

(3) benzene ring with CH_2Cl

(4) benzene ring with $CHCl_2$

Ans. (4)

Sol. CH_3 benzene $\xrightarrow[h\nu]{2\ Cl_2}$ benzene with $CH\begin{smallmatrix}Cl\\Cl\end{smallmatrix}$ $\xrightarrow[373\ K]{H_2O}$ benzene with CHO

155. Paper chromatography is an example of:

(1) Column chromatography

(2) Adsorption chromatography

(3) Partition chromatography

(4) Thin layer chromatography

Ans. (3)

Sol. 11th NCERT (12.8.5) chromatography

156. Identify the **incorrect** match :

Name	IUPAC Official Name
(a) Unnilunium	(i) Mendelevium
(b) Unniltrium	(ii) Lawrencium
(c) Unnilhexium	(iii) Seaborgium
(d) Unununnium	(iv) Darmstadtium

(1) (d), (iv)　　　(2) (a), (i)

(3) (b), (ii)　　　(4) (c), (iii)

Ans. (1)

Sol. Unununium (Z = 111) it is Rontgentum (Rg) not darmstadtium.

157. Find out the solubility of $Ni(OH)_2$ in 0.1M NaOH. Given that the ionic product of $Ni(OH)_2$ is 2×10^{-15}.

(1) 1×10^8 M

(2) 2×10^{-13} M

(3) 2×10^{-8} M

(4) 1×10^{-13} M

Ans. (2)

Sol. α = 1 for NaOH

$$NaOH_{(aq)} \longrightarrow \underset{0.1M}{Na^+(aq)} + \underset{0.1M}{OH^-(aq)}$$

$$Ni(OH)_2(s) \rightleftharpoons \underset{S'}{Ni^{+2}(aq)} + \underset{0.1+2S'}{2OH^-(aq)}$$
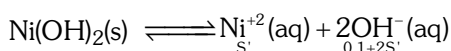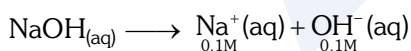
Ionic product　= (S') (0.1 + 2S')^2

2×10^{-15} = S'(0.1)^2

$\qquad$ S' = 2×10^{-13} M

158. Which of the following is a natural polymer ?

(1) poly (Butadiene-acrylonitrile)

(2) cis-1,4-polyisoprene

(3) poly (Butadiene-styrene)

(4) polybutadiene
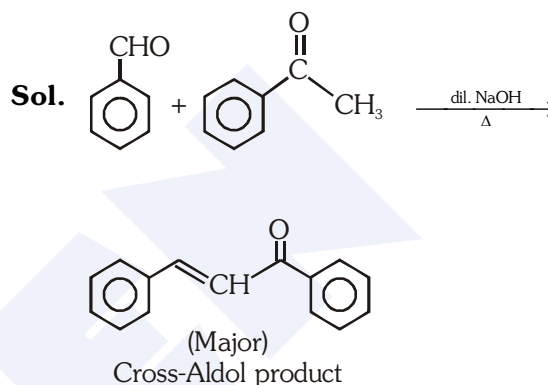
Ans. (2)

Sol. 12th NCERT (15.2.4)

159. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

(1) Cross Aldol condensation

(2) Aldol condensation

(3) Cannizzaro's reaction

(4) Cross Cannizzaro's reaction

Ans. (1)

Sol.

(Major)
Cross-Aldol product

160. The mixture which shows positive deviation from Raoult's law is :-

(1) Chloroethane + Bromoethane

(2) Ethanol + Acetone

(3) Benzene + Toluene

(4) Acetone + Chloroform

Ans. (2)

Sol. Hydrogen bond of ethanol gets weakened by addition of acetone.

161. The rate constant for a first order reaction is 4.606×10^{-3} s^{-1} . The time required to reduce 2.0 g of the reactant to 0.2 g is :

(1) 1000 s　　　(2) 100 s

(3) 200 s　　　(4) 500 s

Ans. (4)

Sol. k = $4.606 \times 10^{-3} s^{-1}$

$$kt = 2.303 \log_{10} \frac{2}{0.2}$$

$$4.606 \times 10^{-3} \times t = 2.303 \times \log 10$$

$$t = \frac{1000}{2} = 500 s$$

162. HCl was passed through a solution of $CaCl_2$, $MgCl_2$ and NaCl. Which of the following compound(s) crystallise(s) ?

(1) NaCl, $MgCl_2$ and $CaCl_2$

(2) Both $MgCl_2$ and $CaCl_2$

(3) Only NaCl

(4) Only $MgCl_2$

Ans. (3)

Sol. When HCl is passed thorough the mixture Cl^- ion concentration increases. Hence ionic product $[Na^+]\,[Cl^-]$

becomes more than solubility product.

So NaCl will precipitate out.

Filtrate $\xrightarrow{\text{HCl gas passed}}$ pure NaCl

precipitation (common ion effect)

163. The correct option for free expansion of an ideal gas under adiabatic condition is :

(1) $q > 0$, $\Delta T > 0$ and $w > 0$

(2) $q = 0$, $\Delta T = 0$ and $w = 0$

(3) $q = 0$, $\Delta T < 0$ and $w > 0$

(4) $q < 0$, $\Delta T = 0$ and $w = 0$

Ans. (2)

Sol. free expansion of ideal gas

$$P_{ext} = 0$$
$$W_{pv} = 0$$
$$q = 0 \text{ (adiabatic process)}$$
$$\Delta E = q + w$$
$$\Delta E = 0$$
$$\Delta E = nC_{vm}\,\Delta T = 0$$

$q = 0$, $\Delta T = 0$, $w = 0$

164. Identify the **correct** statements from the following:

(a) $CO_2(g)$ is used as refrigerant for ice-cream and frozen food.

(b) The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.

(c) ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.

(d) CO is colorless and odourless gas.

(1) (c) and (d) only

(2) (a) and (b) and (c) only

(3) (a) and (c) only

(4) (b) and (c) only
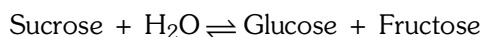
Ans. (1)

Sol. Correct statement are (c) and (d)

(c) use of zeolite (3d-silicate)

(d) CO-neutral, colourless & odourless gas.

165. Hydrolysis of sucrose is given by the following reaction.

Sucrose + $H_2O \rightleftharpoons$ Glucose + Fructose

If the equilibrium constant (K_c) is 2×10^{13} at 300K, the value of $\Delta_r G^{\ominus}$ at the same temperature will be:

(1) -8.314 J mol^{-1} K$^{-1} \times 300$ K $\times \ln(4 \times 10^{13})$

(2) -8.314 J mol^{-1} K$^{-1} \times 300$ K $\times \ln(2 \times 10^{13})$

(3) 8.314 J mol^{-1} K$^{-1} \times 300$ K $\times \ln(2 \times 10^{13})$

(4) 8.314 J mol^{-1} K$^{-1} \times 300$ K $\times \ln(3 \times 10^{13})$

Ans. (2)

Sol. $K_c = 2 \times 10^{13}$
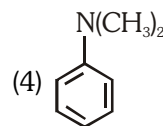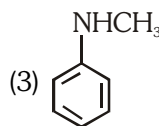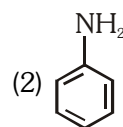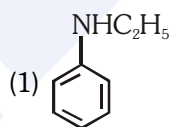
T = 300K

$\Delta G^\circ = -RT \ln k_{eq}$

$\Delta G^\circ = -8.314$ JK^{-1} mol$^{-1} \times 300$ K $\times \ln(2 \times 10^{13})$
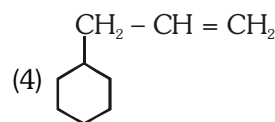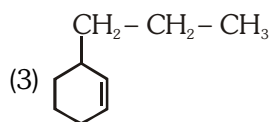
166. Which of the following amine will give the carbylamine test?

(1) NHC_2H_5 attached to benzene ring

(2) NH_2 attached to benzene ring

(3) $NHCH_3$ attached to benzene ring

(4) $N(CH_3)_2$ attached to benzene ring
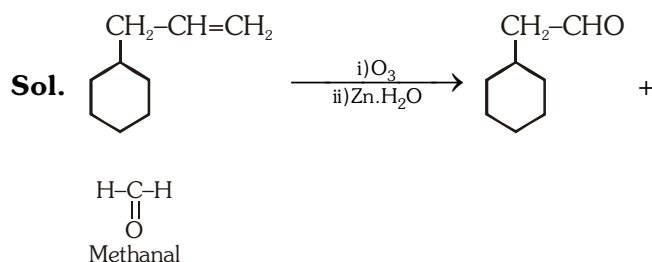
Ans. (2)

Sol. Since NH_2 attached to benzene ring is primary amine it gives carbylamine test (isocyanide test)

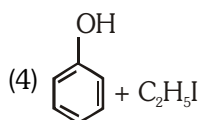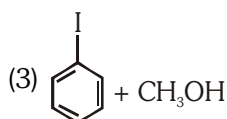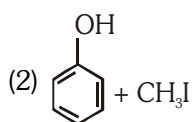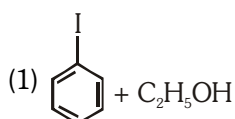**167.** An alkene on ozonolysis gives methanal as one of the product. Its structure is :

(1) cyclohexene with $CH_2CH_2CH_3$ substituent

(2) cyclohexane with $CH=CH-CH_3$ substituent

(3) cyclohexene with $CH_2-CH_2-CH_3$ substituent

(4) cyclohexane with $CH_2-CH=CH_2$ substituent

Ans. (4)

Sol.
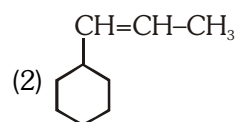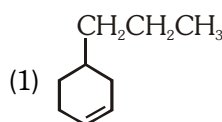
168. Anisole on cleavage with HI gives:

(1) + C_2H_5OH

(2) + CH_3I

(3) + CH_3OH

(4) + C_2H_5I

Ans. (2)

Sol.

 + $CH_3 - I$
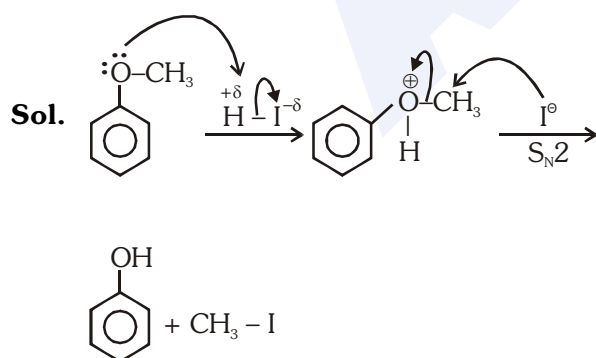
169. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is:

(a) β-Elimination reaction

(b) Follow Zaitsev rule

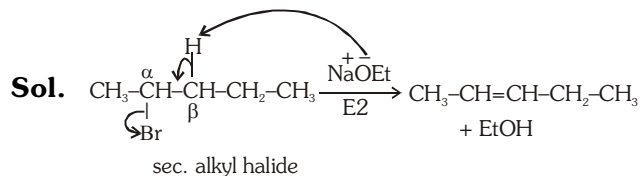(c) Dehydrohalogenation reaction

(d) Dehydration reaction

(1) (a), (b), (d)   (2) (a), (b), (c)

(3) (a), (c), (d)   (4) (b), (c), (d)

Ans. (2)

Sol.

sec. alkyl halide

* This reaction is an example of β-elimination.

* Hydrogen is removed from β-carbon and halgoen from α-carbon, hence, dehydrohalgoenation reaction.

* Generally in E2 reaction Zaitsev alkene is formed as major product (more stable alkene).

170. An increase in the concentration of the reactants of a reaction leads to change in :

(1) collision frequency

(2) activation energy

(3) heat of reaction
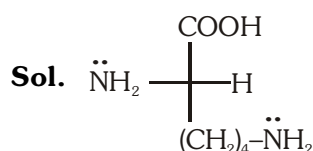
(4) threshold energy

Ans. (1)

Sol. Collision frequency

$Z_{12} \propto$ number of reactant molecules per unit volume.

171. Which of the following is a basic amino acid :

(1) Lysine

(2) Serine

(3) Alanine

(4) Tyrosine

Ans. (1)

Sol.

Lysine

Since it contains more number of $-NH_2$ groups as compared to $-COOH$ groups hence it is basic amino acid.

172. The following metal ion activates many enzymes, participates in the oxidation of glucose to produdce ATP and with Na, is responsible for the transmission of nerve signals.

(1) Potassium

(2) Iron

(3) Copper

(4) Calcium

Ans. (1)

Sol. Biological importance of sodium & potassium.

173. For the reaction $2Cl(g) \to Cl_2(g)$, the **correct** option is:

(1) $\Delta_r H < 0$ and $\Delta_r S < 0$

(2) $\Delta_r H > 0$ and $\Delta_r S > 0$

(3) $\Delta_r H > 0$ and $\Delta_r S < 0$

(4) $\Delta_r H < 0$ and $\Delta_r S > 0$

Ans. (1)

Sol. $2Cl(g) \longrightarrow Cl_2(g)$

$\Delta_r S < 0$ and $\Delta_r H < 0$

174. Match the following :

Oxide	Nature
(a) CO	(i) Basic
(b) BaO	(ii) Neutral
(c) Al_2O_3	(iii) Acidic
(d) Cl_2O_7	(iv) Amphoteric

Which of the following is **correct** option?

	(a)	(b)	(c)	(d)
(1)	(iv)	(iii)	(ii)	(i)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iii)	(iv)	(i)	(ii)

Ans. (3)

Sol. (a) CO   (ii) Neutral

(b) BaO   (i) Basic

(c) Al_2O_3 (iv) Amphoteric

(d) Cl_2O_7 (iii) Acidic

175. Measuring Zeta potential is useful in determining which property of colloidal solution?

(1) Size of the colloidal particles

(2) Viscosity

(3) Solubility

(4) Stability of the colloidal particles

Ans. (4)

Sol. Greater the Zeta potential more will be the stability of colloidal particles.

176. A mixture of N_2 and Ar gases in a cylinder contains 7g of N_2 and 8g of Ar. If the total pressure of the mixture of gases in the cylinder is 27 bar, the partial pressure of N_2 is:

[Use atomic masses (in g mol^{-1}) : N = 14, Ar = 40]

(1) 18 bar   (2) 9 bar

(3) 12 bar   (4) 15 bar

Ans. (4)

Sol.

	N_2	Ar
	7 gram	8 gram
moles	$\frac{7}{28} = \frac{1}{4}$	$\frac{8}{40} = \frac{1}{5}$

$(\text{Partial pressure})_{N_2} = P_T \times (\text{mole fraction})_{N_2}$

$$= 27 \times \frac{1/4}{1/4 + 1/5}$$

$$= 27 \times \frac{1/4}{9/20}$$

$$= 27 \times \frac{20}{4 \times 9}$$

$$= 3 \times 5$$

$$= 15 \text{ bar}$$

177. Which of the following is **not** correct about carbon monoxide?

(1) It is produced due to incomplete combustion

(2) It forms carboxyhaemoglobin

(3) It reduce oxygen carrying ability of blood

(4) The carboxyhaemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.

Ans. (4)

Sol. Not correct

Carboxyhaemoglobin (haemoglobin bound to CO) is more stable than oxyhaemoglobin.

178. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is :

(1) $\dfrac{4}{\sqrt{2}} \times 288\,\text{pm}$

(2) $\dfrac{\sqrt{3}}{4} \times 288\,\text{pm}$

(3) $\dfrac{\sqrt{2}}{4} \times 288\,\text{pm}$

(4) $\dfrac{4}{\sqrt{3}} \times 288\,\text{pm}$

Ans. (2)

Sol. $\sqrt{3}a = 4r$ (for bcc lattice)

$r = \dfrac{\sqrt{3}}{4} \times 288$ pm

179. Which one of the following has maximum number of atoms?
(1) 1g of Li(s) [Atomic mass of Li = 7]
(2) 1g of Ag(s) [Atomic mass of Ag = 108]
(3) 1g of Mg(s) [Atomic mass of Mg = 24]
(4) 1g of O$_2$(g) [Atomic mass of O = 16]

Ans. (1)

Sol. Number of atoms

$= \dfrac{w}{\text{molar mass}} \times N_A \times \text{atomicity}$

(1) $\dfrac{1}{7} \times N_A \times 1$

(2) $\dfrac{1}{108} \times N_A \times 1$

(3) $\dfrac{1}{24} \times N_A \times 1$

(4) $\dfrac{1}{32} \times N_A \times 2$

180. On electrolysis of dil. sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be:
(1) SO$_2$ gas
(2) Hydrogen gas
(3) Oxygen gas
(4) H$_2$S gas

Ans. (3)

Sol. H$_2$SO$_4$

At Anode : $2H_2O \rightarrow O_{2(g)} + 4H^+_{(aq)} + 4e^-$

Oxygen gas will liberate at anode