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PHYSICS

1) A metallic surface is illuminated with monochromatic light of wavelength λ and stopping potential for photoelectric current is $5V_0$. When the same metallic surface is illuminated with a light of wavelength 2λ , the stopping potentials is V_0. What is the threshold wavelength for the surface ?

(1) $\frac{8}{3}\lambda$

(2) 8λ

(3) 5λ

(4) 4λ

2) **Statement (1) :** If intensity of monochromatic light is increased then number of photon passing through a given area increases per second. While energy of each photon remains same.
Statement (2) : In photon matter collision total linear momentum and total energy remains conserved.

(1) (1) & (2) both are correct

(2) (1) is correct but (2) is not correct

(3) (1) is not correct but (2) is correct

(4) Both (1) and (2) are incorrect.

3) Photoelectric emission is observed from a metallic surface for frequencies v_1 and v_2 of the incident light rays ($v_1 > v_2$). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio of 1 : k, then the threshold frequency of the metallic surface is :-

(1) $\frac{v_1 - v_2}{k - 1}$

(2) $\frac{kv_1 - v_2}{k - 1}$

(3) $\frac{kv_2 - v_1}{k - 1}$

(4) $\frac{v_2 - v_1}{k}$

4) Monochromatic light of wavelength 3000Å is incident on a surface area $4cm^2$ if intensity of light is 150 mW/m² then rate at which photons strike the target :-

(1) 3×10^{10}/s

(2) 9×10^{13}/s

(3) 7×10^{15}/s

(4) 6×10^{19}/s

5) When the light source is kept 20 cm away from a photo cell, stopping potential 0.6 V is obtained.

When source is kept 40 cm away, the stopping potential will be:-

(1) 0.3 V

(2) 0.6 V

(3) 1.2 V

(4) 2.4 V

6) The work function of a surface of a photosensitive material is 6.2 eV. The wavelength of incident radiation is 2500 Å, for which the maximum kinetic energy of photoelectrons is-

(1) 1.2 eV

(2) 11.2 eV

(3) 10 eV

(4) Photoelectric effect is not valid

7) Electrons with de-Broglie wavelength λ fall on the target in an X-ray tube. The cut-off wavelength of the emitted X-rays is :-

(1) $\lambda^0 = \dfrac{2mc\,\lambda^2}{h}$

(2) $\lambda^0 = \dfrac{2h}{mc}$

(3) $\lambda^0 = \dfrac{2m^2c^2\lambda^3}{h^2}$

(4) $\lambda_0 = \lambda$

8)

Photon of wavelength 500 nm incident on a metal of work function 2.44 eV. The de-Broglie wavelength of emitted photoelectron will be-

(1) $= 6.135 \times 10^{-11}\,m$

(2) $\geqslant 6.135 \times 10^{-9}\,m$

(3) $< 6.135 \times 10^{-12}\,m$

(4) $\leqslant 6.135 \times 10^{-12}\,m$

9)

A nucleus at rest splits into two parts having speeds in ratio 1 : 27, then. Ratio of their nucleus radii will be-

(1) 2 : 1

(2) 1 : 2

(3) 3 : 1

(4) 1 : 3

10)

For nuclear force which of the following is/are correct.
(a) Nuclear force is independent of charge of nucleons
(b) Nuclear force possess saturation ration properties
(c) Nuclear force depends on mutual orientation of spin of nucleons
(d) Range of nuclear force is twice that of coulomb force

(1) Only a

(2) a, c, d

(3) a, b, c

(4) b, c, d

11) The number of α and β⁻ emitted during the radioactive decay chain starting from $_{88}^{226}Ra$ and ending at $_{82}^{206}Pb$ is

(1) 3α & 6β⁻

(2) 4α & 5β⁻

(3) 5α & 4β⁻

(4) 6α & 6β⁻

12) A radioactive nucleus $_Z X^A$ emit 3α–particles and 5β–particles. The ratio of number of neutrons to that of protons in the product nucleus will be :–

(1) $\dfrac{A - Z - 12}{Z - 6}$
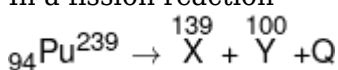
(2) $\dfrac{A - Z}{Z - 1}$

(3) $\dfrac{A - Z - 11}{Z - 6}$

(4) $\dfrac{A - Z - 11}{Z - 1}$

13) The momentum of a photon is 3.3×10^{-29} kg-m/s. Its frequency will be

(1) 3×10^3 Hz

(2) 6×103 Hz

(3) 7.5×10^{12} Hz

(4) 1.5×10^{13} Hz

14)

In a fission reaction
$$_{94}Pu^{239} \rightarrow {}^{139}X + {}^{100}Y + Q$$
The binding energy per nucleon of X and Y is 8.4 MeV whereas of Pu^{239} is 705 MeV, the total energy released-

(1) 215.1 MeV

(2) 352.2 MeV

(3) 415.2 MeV

(4) 125.3 MeV

15)

The binding energy per nucleon of O^{16} is 7.97 MeV and that O^{17} is 7.75 MeV. the energy (in MeV) required to remove a neutron from O^{17} is -

(1) 3.52

(2) 3.64

(3) 4.23

(4) 7.86

16)

de-Broglie wavelength of electron in second excited state in hydrogen atom is nearly-

(1) 5 Å

(2) 10 Å

(3) 15 Å

(4) 12 Å

17) The collector plate in an experiment on photoelectric effect is kept vertically above the emitter plate. Light source is put on and a saturation photo current is recorded. An electric field is switched on which has a vertically downward direction -

(1) The photo current will increase

(2) The kinetic energy of the electrons will increase

(3) The stopping potential will decrease

(4) The threshold wavelength will increase

18) The electron in the hydrogen atom jumps from excited state (n = 3) to its ground state (n = 1) and the photons thus emitted irradiate a photosensitive material. If the work function of the material is 5.1 eV, the stopping potential is estimated to be (the energy of the electron in n^{th} state $E_n = -\dfrac{13.6}{n^2}eV$):-

(1) 12.1 V

(2) 17.2 V

(3) 7 V

(4) 5.1 V

19) If the momentum of an electron is changed by P, then the de Broglie wavelength associated with it changes by 0.5%. The initial momentum of electron will be :-
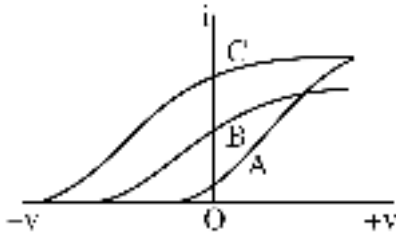
(1) $\dfrac{P}{200}$

(2) 100 P

(3) 200 P

(4) 400 P

20)

The following graph is between Anode potential and photoelectric current photoelectric experiment for three different light radiations then-

(1) Wavelength of A is less than that of B

(2) Wavelength of C is maximum while that of A is minimum

(3) Wavelength of B is more than C but less than A

(4) Intensity of A is less than C

21)

If energy of an electron is increased by 44% find percentage in its de-Broglie wavelength-

(1) 25 % decrease

(2) 16.6 % decrease

(3) 64 % decrease

(4) 16 % decrease

22) A proton and an α - particle accelerated through same voltage. The ratio of their De-broglie wavelength will be :

(1) 1 : 2

(2) $2\sqrt{2} : 1$

(3) $\sqrt{2} : 1$

(4) 2 : 1

23)

If the work function of a metal is ϕ and the frequency of the incident light is ν. There is no emission of photoelectron if -

(1) $\nu < \dfrac{\phi}{h}$

(2) $\nu = \dfrac{\phi}{h}$

(3) $\nu > \dfrac{\phi}{h}$

(4) $\nu \geqslant \dfrac{\phi}{h}$

24) There are n_1 photons of frequency γ_1 in a beam of light. In an equally energetic beam, there are n_2 photons of frequency γ_2. Then the correct relation is :-

(1) $\dfrac{n_1}{n_2} = 1$

(2) $\dfrac{n_1}{n_2} = \dfrac{\gamma_1}{\gamma_2}$

(3) $\dfrac{n_1}{n_2} = \dfrac{\gamma_2}{\gamma_1}$

(4) $\dfrac{n_1}{n_2} = \dfrac{\gamma_1^2}{\gamma_2^2}$

25) In the given reaction
$_zX^A \rightarrow\, _{z+1}Y^A \rightarrow\, _{z-1}K^{A-4} \rightarrow\, _{z-1}K^{A-4}$ radioactive radiations are emitted in the sequence :-
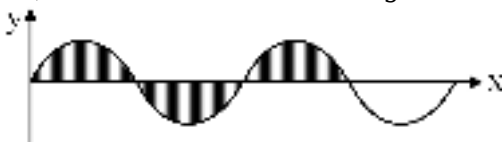
(1) α, β^-, γ

(2) β^-, α, γ

(3) γ, α, β^-

(4) β^-, γ, α

26) Find area of the following shaded region if the given graph is y = sinx
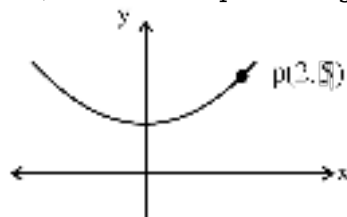

(1) 1

(2) 2

(3) 3

(4) 1/2

27) Find the slope of tangent at point P on the given graph where $y = x^2 + 1$.

(1) 2

(2) 6

(3) 3

(4) 4

28) If the volume of a sphere increases at constant rate $\left(\dfrac{dV}{dt} = 4\right)$. If radius of the sphere is denoted by r, then surface area of the sphere increases at the rate :

(1) $\dfrac{4}{r}$

(2) $\dfrac{8}{r}$

(3) $\dfrac{12}{r}$

(4) $\dfrac{16}{r}$

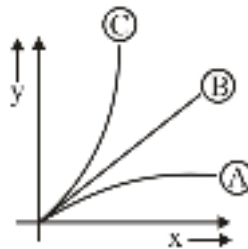29) Sum of infinite terms of a G.P. is 12. If the first term is 8, the fourth term of this G.P. is :-

(1) $\dfrac{8}{27}$

(2) $\dfrac{4}{27}$

(3) $\dfrac{8}{20}$

(4) $\dfrac{1}{3}$

30) The value of $\log_{10}(32)$ is (use $\log_{10} 2 \approx 0.301$) :

(1) 1.505

(2) 1.405

(3) 2.4

(4) 0.8

31) $(0.97)^{1/3}$ is approximately equals to :
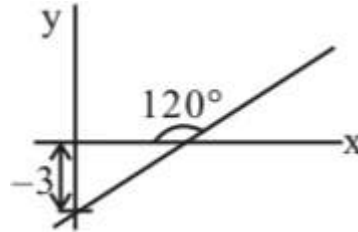
(1) 0.99

(2) 0.01

(3) 0.985

(4) None

32) $y = \sqrt{x}$ then graph between y and x will be :

(1) A

(2) B

(3) C

(4) None of these

33) If $y = \ln(3x^2 +1)$ than $\dfrac{dy}{dx}$ is :

(1) $\dfrac{\left(3x^2 + 1\right)}{x}\,(6x)$

(2) $\dfrac{6x}{\left(3x^2 + 1\right)}$

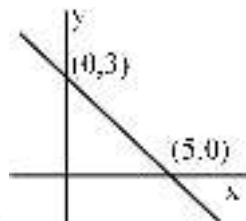(3) $\dfrac{\left(3x^2 + 1\right)}{x^2}$

(4) 6

34) For a given graph, which is correct:

(1) $\sqrt{3}y = 3\left(x + \sqrt{3}\right)$

(2) slope m is $\dfrac{1}{\sqrt{3}}$

(3) $C = 3\sqrt{3}$

(4) All are correct

35) $(1.01)^3 = a$
$(1.02)^2 = b$
Then,

(1) $a - b = 0.04$

(2) $a - b = 0.02$

(3) $a - b = 0.03$

(4) $b - a = 0.01$

36) Calculate slope of line :-

(1) $\dfrac{5}{3}$

(2) $\dfrac{3}{5}$

(3) $-\dfrac{5}{3}$

(4) $-\dfrac{3}{5}$

37) A particle moves from position $3\hat{i} + 2\hat{j} - 6\hat{k}$ to $14\hat{i} + 13\hat{j} + 9\hat{k}$ due to a force $\vec{F} = \left(4\hat{i} + \hat{j} + 3\hat{k}\right)$ N. If the displacement is in centimeter then work done will be :

(1) 1 J

(2) 2 J

(3) 3 J

(4) 2.5 J

38) A small block of mass 2kg slides down a smooth quarter circular track of radius 2m released from top. It further moves on rough horizontal surface compresses the spring by 2m before coming to rest. Find the value of coefficient of friction if spring constant is 10N/m.
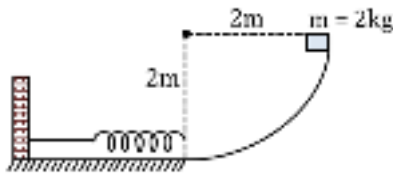
(1) 0.5

(2) 0.1

(3) 0.4

(4) 0.2

39) The spring is stretched by 2cm from natural length to increase its potential energy to 25J. How much more it must be stretched to further increase its potential energy by 75J.

(1) 4 cm

(2) 3 cm

(3) 2 cm

(4) 8 cm

40) A force $F = (a + bx^2)$N acts on an object in the x-direction. The work done by the force is 5 J when the object is displaced by 1 m. If the constant $a = 1$N then b will be

(1) 15 N/m^2

(2) 10 N/m^2

(3) 12 N/m^2

(4) 8 N/m^2

41) Two persons A and B perform same amount of work in moving a body through same distance d with application of forces acting at angles 45° and 60°, respectively with the direction of displacement. The ratio of force applied by person A to the force applied by person B is

(1) 1 : 1

(2) $1 : \sqrt{2}$

(3) $\sqrt{2} : 1$

(4) $\sqrt{3} : 2$

42) A ball of mass 800 g is thrown vertically upwards with initial velocity 20 m/s. If due to air resistance and gravity ball reached maximum height of 16 m. The work done by air resistance is- (g = 10 m/s^2)

(1) –20 J

(2) –28 J

(3) – 32 J

(4) –40 J

43)

A block of mass 1.2 kg moving in y-direction with a speed of 4 m/s is subjected to a retarding force F = $\left(\dfrac{2}{y}\right)$ N during its travelling from y = 10 m to y = 20 m. Its final kinetic energy will be- (ln 2 ≈ 0.7)

(1) 9.6 J

(2) 4.8 J

(3) 6.3 J

(4) 8.2 J

44) KE of a body is increased by 44%. What is the percent increase in the momentum?

(1) 10%

(2) 20%

(3) 30%

(4) 40%

45) Work done in time t on a body of mass m which is accelerated from rest to a speed v in time t_1 as a function of time t is given by :-

(1) $\dfrac{1}{2}m\dfrac{v}{t_1}t^2$

(2) $m\dfrac{v}{t_1}t^2$

(3) $\dfrac{1}{2}\left(\dfrac{mv}{t_1}\right)^2 t^2$

(4) $\dfrac{1}{2}m\dfrac{v^2}{t_1^2}t^2$

CHEMISTRY

1) The rate equation of a reaction is as follows :

$$\text{rate} = k[P][Q]^{0.5}[R]^{0.5}$$

Which is statement about the above equation is wrong ?
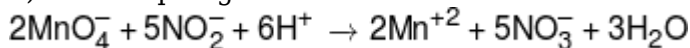
(1) Order with respect to P is one

(2) Total order of the reaction is two

(3) Order with respect to each of Q and R is 0.5

(4) Unit of specific reaction rate is mol $L^{-1}s^{-1}$

2) At 27°C, for the reaction, $N_2O_{4(g)} \rightarrow 2NO_{2(g)}$,
rate of reaction is 6×10^{-3} atm min^{-1}. Find rate of same reaction in terms of mol L^{-1} min^{-1}.

(1) 1.2×10^{-4}

(2) 2.4×10^{-4}

(3) 3.2×10^{-2}

(4) 6×10^{-3}

3) With help of given reaction :
$$2MnO_4^- + 5NO_2^- + 6H^+ \rightarrow 2Mn^{+2} + 5NO_3^- + 3H_2O$$
Calculate the rate (in Ms^{-1}) at which the NO_2^- concentration is decreasing if the MnO_4^- is decreasing at a rate of 0.024 M s^{-1}.

(1) 4.8×10^{-3}

(2) 6×10^{-2}

(3) 3×10^{-2}

(4) 2.4×10^{-3}

4) For the reaction A + B → C; starting with different initial concentration of A and B, initial rate of reaction were determined graphically in three experiments.

S.No.	$[A]_0$/M (Initial conc.)	$[B]_0$/M (Initial conc.)	rate/ (M s^{-1})
1	1.6×10^{-3}	5×10^{-2}	10^{-3}
2	3.2×10^{-3}	5×10^{-2}	4×10^{-3}
3	1.6×10^{-3}	10^{-1}	2×10^{-3}

Rate law for reaction from above data is:-

(1) $r = k[A]^2 [B]^2$

(2) $r = k[A]^2 [B]$

(3) $r = k[A] [B]^2$

(4) $r = k[A] [B]$

5) For the reaction
$$3I^- + S_2O_8^{2-} \rightarrow I_3^{\ominus} + 2SO_4^{2-}$$
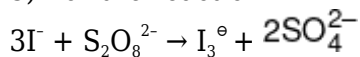
if $-\dfrac{\Delta\left[S_2O_8^{2-}\right]}{\Delta t} = 1.5 \times 10^{-3}$ M $\times$ s^{-1}

Then value of $-\dfrac{\Delta[I^-]}{\Delta t}$ will be :-

(1) 4.5×10^{-3} M $\times$ s^{-1}

(2) 5×10^{-4} M × s^{-1}

(3) 1.5×10^{-3} M × s^{-1}

(4) 3×10^{-3} M × s^{-1}

6) For an elementary reaction : A + 2B → product,
The differential rate equation is :-

(1) $-\dfrac{1}{2}\dfrac{d[A]}{dt} = -\dfrac{d[B]}{dt} = k[A][B]^2$

(2) $\dfrac{1}{2}\dfrac{d[A]}{dt} = \dfrac{d[B]}{dt} = k[A][B]^2$

(3) $-\dfrac{d[A]}{dt} = -\dfrac{1}{2}\dfrac{d[B]}{dt} = k[A][B]^2$

(4) $\dfrac{d[A]}{dt} = \dfrac{1}{2}\dfrac{d[B]}{dt} = k[A][B]^2$

7) For a reaction $2SO_2 + O_2 \rightarrow 2SO_3$ if rate of formation of SO_3 is 0.8 g/min. Then what will be rate of disappearance of SO_2

(1) 1.6 g/min

(2) 0.64 g/min

(3) 10^{-3} mol/min

(4) 10^{-4} g/min

8) The reaction, X + 2Y + Z → N occurs by the following mechanism
(i) X + Y ⇌ M (very rapid equilibrium)
(ii) M + Z → O (slow)
(iii) O + Y → N (very fast)
What is the rate law for this reaction

(1) Rate = k[Z]

(2) Rate = k[X] [Y]^2 [Z]

(3) Rate = [N]

(4) Rate = k[X] [Y] [Z]

9) Which of the following statement is incorrect?

(1) Unit of rate of disappearance is Ms^{-1}

(2) Unit of rate of reaction is Ms^{-1}

(3) Unit of rate constant k depends upon order

(4) Unit of k for first order reaction is Ms^{-1}

10) The decomposition of dimethylether leads to formation of CH_4, H_2, CO and reaction rate is given by rate = $K\left[P_{CH_3OCH_3}\right]^{3/2}$ if pressure is measured in bar and time in minutes then what is unit of rate and rate constant -

(1) bar min^{-1}, min^{-1}

(2) bar, min^{-1}

(3) bar min^{-1}, bar$^{-1/2}$ min^{-1}

(4) bar min^{-1}, bar$^{3/2}$ min^{-1}

11) For a first order gas phase reaction :

$A(g) \rightarrow 3B(g) + C(g)$
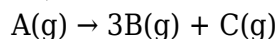
Let P_0 be initial pressure of A and P_t the total pressure at time 't'. integrated rate equation is :

(1) $kt = \ln \dfrac{3P_0}{4P_0 - P_t}$

(2) $kt = \ln \dfrac{P_0}{3P_0 - P_t}$

(3) $kt = \ln \dfrac{P_0}{3P_0 - 2P_t}$

(4) $kt = \ln \dfrac{3P_0}{2P_0 - P_t}$

12) A hypothetical reaction, $A_2 + B_2 \rightarrow 2AB$ follows the mechanism as given below,

$A_2 \rightleftharpoons A + A$ (fast)

$A + B_2 \rightarrow AB + B$ (slow)

$A + B \rightarrow AB$ (fast)
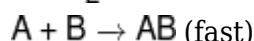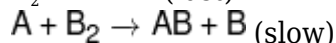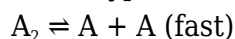
The order of the overall reaction is :

(1) 2

(2) 1

(3) $1\dfrac{1}{2}$

(4) 0

13) The order of a reaction with rate equal $= kC_A^{3/2} C_B^{-1/2}$ is :

(1) 1

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

(3) $-\dfrac{3}{2}$

(4) 2

14)

During the kinetic study of the reaction, $2A + B \rightarrow C + D$, following results were obtained:-

Ex. No.	[A] (mol L^{-1})	[B] (mol L^{-1})	Initial rate of formation of D(mol L^{-1}min^{-1})
I	0.1	0.1	6.0×10^{-3}

II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Based on the above data which one of the following is correct ?

(1) rate = $k[A][B]^2$

(2) rate = $k[A]^2[B]$

(3) rate = $k[A][B]$

(4) rate = $k[A]^2[B]^2$

15) for an elementary reaction A + 2B → P; if rate constant is 2×10^{-6} mol^{-2} L^2 s^{-1} and concentration of A and B was 0.1 M, 0.2 M initially. Calculate rate of reaction when A is reduced to 0.05 M is :-

(1) 8×10^{-9} Ms^{-1}

(2) 3.889×10^{-9} Ms^{-1}

(3) 4.8×10^{-9} Ms^{-1}

(4) 10^{-9} Ms^{-1}

16) The rate of the first order reaction, A → Products, is 7.5×10^{-4} mol L^{-1} s^{-1}, when the concentration of A is 0.2 mol L^{-1}. The rate constant of the reaction is:

(1) 2.5×10^{-5} s^{-1}

(2) 8.0×10^{-4} s^{-1}

(3) 6.0×10^{-4} s^{-1}

(4) 3.75×10^{-3} s^{-1}

17) For the reaction $N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$, the value of rate of disappearance of N_2O_5 is given as 6.25×10^{-3} mol $L^{-1}s^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as :

(1) 1.25×10^{-2} $molL^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$

(2) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$

(3) 1.25×10^{-2} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$

(4) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$

18) A complex reaction : 2X + Y → Z, takes place in two steps

$X + Y \xrightarrow{K_1} 2W, \quad X + 2W \xrightarrow{K_2} Z$
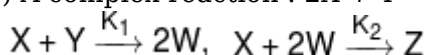
If $K_1 << K_2$, order of reaction will be

(1) 1

(2) 2

(3) 3

(4) 0

19) The initial rate of the reaction,
2NO + O_2 → $2NO_2$, at 25°C is 0.028 mol L^{-1} s^{-1}. The experiment rate is given by :-

$r = k[NO]^2[O_2]$

If the initial concentrations of the reactants are

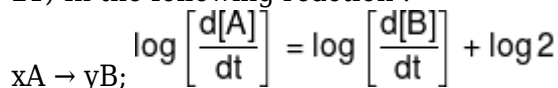$O_2 = 0.040$ mol L^{-1} and $NO = 0.01$ mol L^{-1}, the rate constant of the reaction is :

(1) 7.0×10^{-3} L mol^{-1} s^{-1}

(2) 7.0×10^{-4} L^2 mol^{-2} s^{-1}

(3) 7.0×10^2 L^2 mol^{-2} s^{-1}

(4) 7.0×10^3 L^2 mol^{-2} s^{-1}

20) Consider a graph between half lite ($t_{1/2}$) and initial concentration of reactant (a) for reaction A →

B   a→ So, graph between $-\dfrac{d[A]}{dt}$ and time will be :
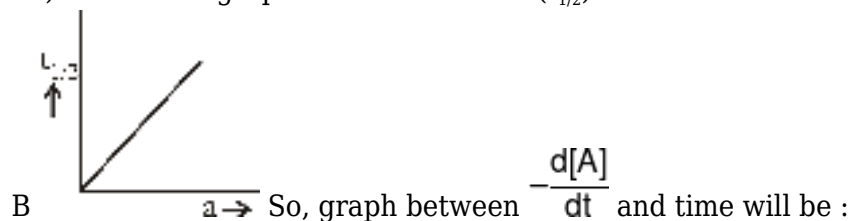
(1)

(2)

(3)

(4)

21) In the following reaction :

$\log\left[\dfrac{d[A]}{dt}\right] = \log\left[\dfrac{d[B]}{dt}\right] + \log 2$

xA → yB;

where −ve sign indicates rate of disappearance of the reactant. Thus, x : y is :

(1) 1 : 2

(2) 2 : 1

(3) 3 : 1

(4) 3 : 10

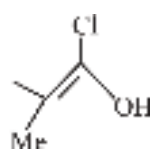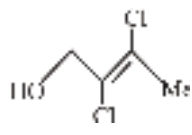22) The rate of certain hypothetical reaction
A + B + C → products is given by
r = K [A]$^{1/2}$[B]$^{1/3}$[C]$^{1/4}$ The order of the reaction :
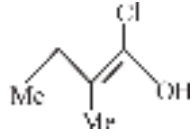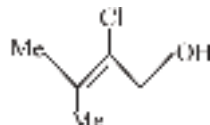
(1) 1

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

(3) 2

(4) $\dfrac{13}{12}$

23) In a reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ the rate of appearance of NH_3 is 2.5×10^{-4} mol L^{-1} sec^{-1}. The rate of reaction & rate of disappearance of H_2 will be (in mol L^{-1} sec^{-1})

(1) 3.75×10^{-4} , 1.25×10^{-4}

(2) 1.25×10^{-4}, 2.5×10^{-4}

(3) 1.25×10^{-4}, 3.75×10^{-4}

(4) 5.0×10^{-4}, 3.75×10^{-4}

24) Which structure represents
2-chloro-3-methylbut-2-en-1-ol

(1)

(2)

(3)

(4)

25) Which is correct IUPAC name

(1) HO–CHO (Hydroxy methanal)

(2) Cl–CHO (Chloro methanal)

(3) H_2N–CHO (Amino methanal)

(4) HOOC–CN (Cyano methanoic acid)

26) What is correct I.U.P.A.C name of following compound

(1) 5–Cyano–4–oxo–3–ketohexanamide

(2) 5–Cyano–4–formyl–3–ketohexanamide

(3) 5–Cyano–5–formyl–3–ketohexanamide

(4) 5–Cyano–4–formyl–3,2–diketohexamine

27) The correct IUPAC name of given compound is–

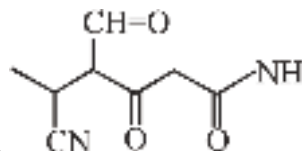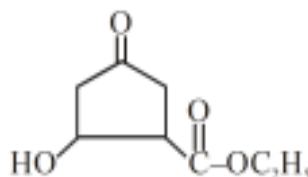(1) Ethyl-3-hydroxy-5-oxo cyclo hexanoate

(2) Ethyl-2-hydroxy-4-oxo cyclopentane carboxylate

(3) Ethyl-5-hydroxy-3-oxo cyclo pentane carboxylate

(4) Ethyl-6-hydroxy-4-oxo cyclo haxanoate
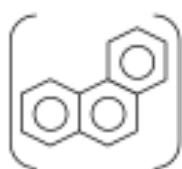
28) In phenanthrene molecule the number of pi-bonds and sigma-bonds respectively are :-

(1) 7 and 26

(2) 7 and 24

(3) 8 and 26

(4) 8 and 24

29) The real revolution in antibacterial thrapy began with the discovery of Alexander Fleming in 1929, of the antibacterial properties of a penicillium fungus. General structure of penicillin is as
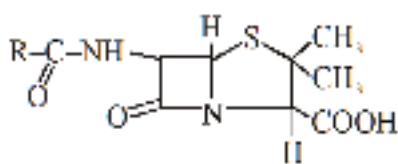
follows :- Which of the following is not correct for penicillin [R=CH_3]

(1) It has carboxylic acid as its functional group.

(2) Degree of unsaturation will be 5

(3) It doesn't have any sp hybridised carbon

(4) It has aldehyde as one of its functional *Group*

30) Which of the following pair represent homologous :

(1)

(2) &

(3) &

(4) &
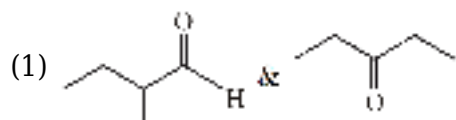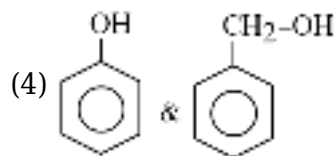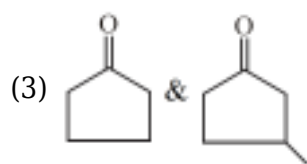
31) Which of the following IUPAC name is incorrect ?

(1) 3,6-Dimethylcyclohexene

(2) 1, 6-Dimethylcyclohexene

(3) 6,6-Dimethylcyclohexene

(4) 1,5-Dimethylcyclohexene
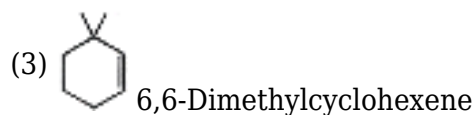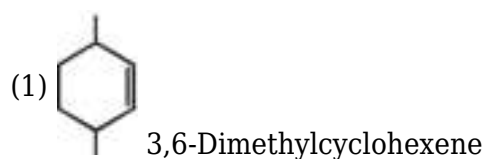
32) Among
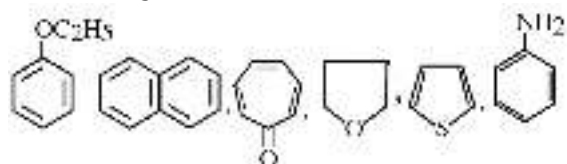
number of heterocyclic aromatic compound(s) is/are :

(1) 1
(2) 3
(3) 4
(4) 2
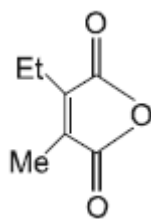
33) Correct IUPAC name of the compound   is-

(1) 2-Ethyl-3-methylbut-2-ene-1, 4-dioic anhydride
(2) 3-Ethyl-2-methylbut-2-enedioic anhydride

(3) 2-Ethyl-3-Methyl-1,4-diketobut-2-enoic anhydride

(4) 2-Ethyl-3-methylcyclopentanoxy-1,4-dione

34) Which of the following name is correct :

(1) Acetanilide

(2) Sulphanilic acid

(3) O-Toluidine
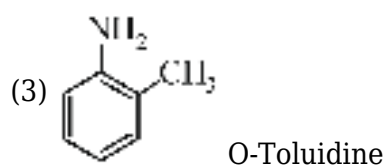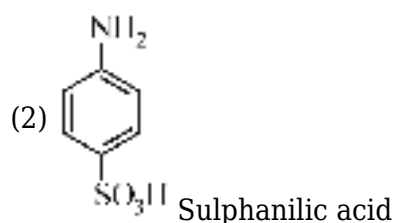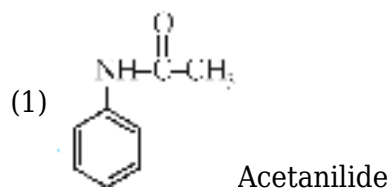
(4) All of these

35) Match the following common name in column-I to the IUPAC name in column-II and choose the correct option from the codes given below :-

	Column-I		Column-II
(A)	Bromoform	(X)	1-bromo-2,2-dimethyl propane
(B)	Vinyl chloride	(Y)	Chlorophenyl methane
(C)	Benzyl chloride	(Z)	Tribromomethane
(D)	Neopentyl bromide	(W)	Chloroethene

	A	B	C	D
(1)	X	Y	Z	W
(2)	Y	Z	W	X
(3)	Z	W	X	Y
(4)	Z	W	Y	X

(1) 1

(2) 2

(3) 3

(4) 4
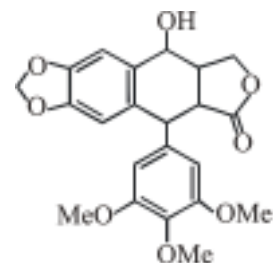
Anti-cancer compound
podophyllotoxin

36) How many sp^3 hybridised carbon atoms are there in the given compound :-

(1) 6
(2) 7
(3) 9
(4) 8

37) 1°, 2°, 3° and 4° carbon atoms present in :-

(1) 2,2,3-trimethyl pentane
(2) 2,3,4-trimethyl pentane
(3) 2,3,4-trimethyl hexane
(4) 2,2,-dimethyl pentane
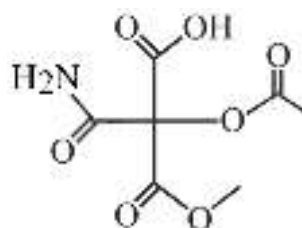
38) Number of carbon atoms present in parent carbon chain :-

(1) 3
(2) 4
(3) 5
(4) 2

39) Out of eight pentyl group's 1°,2°,3° pentyl group's are respectively :-

(1) [1, 3, 4]
(2) [4, 3, 1]
(3) [4, 1, 3]
(4) [3, 1, 4]
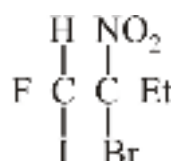
40) The correct IUPAC name of the following compound is :

(1) 1-Bromo-1-ethyl-2-fluoro-2-iodo-1-nitroethane.
(2) 3-Bromo-4-fluoro-4-iodo-3-nitrobutane.

(3) 2-Bromo-1-fluoro-1-iodo-2-nitrobutane.

(4) 1-Fluoro-1-iodo-2-bromo-2-ethyl-2-nitroethane.

41) Find the value of x–y where
x = No of homocyclic compounds
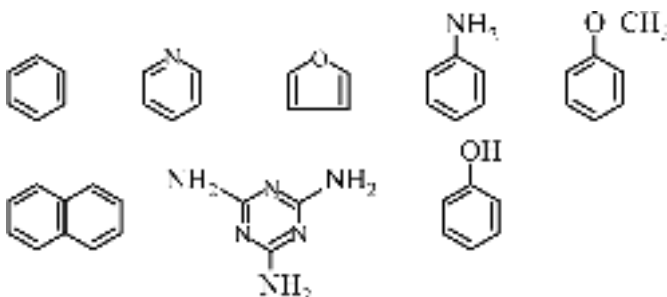
y = No of hetrocyclic compounds

(1) 2

(2) 3

(3) 4

(4) 5

42) The IUPAC name of $CH_3–C(=O)–O–CH_2–CN$ is :

(1) acetonitrile ethanoate

(2) cyanomethyl ethanoate

(3) methyl cyano ethanoate

(4) acetoxy ethane nitrile

43) The IUPAC name of is :

(1) 3-(ethyl methylamino)-5-methyl hexane

(2) N, 4-diethyl-N, 2-dimethyl-4-butanamine

(3) N-ethyl-N, 2-dimethyl-4-hexanamine

(4) N-ethyl-N,5-dimethyl-3-hexanamine

44) The IUPAC name of vanillin i.e :

(1) 4-formyl-2-methoxy phenol

(2) 5-formyl-2-hydroxy anisole

(3) 3-methoxy-4-hydroxy benzene carbaldehyde

(4) 4-hydroxy-3-methoxy benzene carbaldehyde.

45) Which of the following compounds has wrong IUPAC name ?

(1) CH$_3$CH$_2$CH$_2$COOCH$_2$CH$_3$
Ethylbutanoate

(2) CH$_2$–CH–CH$_2$–CHO
          CH$_3$
3–Methylbutanal
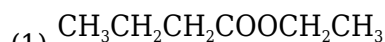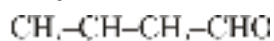
(3) CH$_3$ CH CH CH$_3$
          OH CH$_3$
2–Methyl–3–butanol
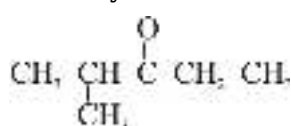
(4) CH$_3$ CH C CH$_2$ CH$_3$
          CH$_3$
         (O)
2–Methyl–3–pentanone

BIOLOGY

1) Which of the following option is not correct ?

(1) Biological names are generally in Latin and written in italics.

(2) The first word in biological name represents the genus while the second component denotes the specific epithet.

(3) Both the words in a biological name, when handwritten, are in italics.

(4) Name of the author appears after the specific epithet

2) The number of species that are known and described range between :

(1) 1.7 to 1.8 billion

(2) 17 to 18 lacs

(3) 1.7 to 1.8 lacs

(4) 17 to 18 million

3) Read the following regarding numerical taxonomy:
(i) It takes use of computers.
(ii) It is based on all observable characters of organisms.
(iii) Vegetative characters are given more importance.
(iv) Number and codes are assigned to all the characters, data are then processed.
(v) Only one character can be considered at a time.
How many of the above statements are correct?

(1) Three

(2) One

(3) All

(4) Two

4) Identify the correct match from the column-I, II and III.

Column-I		Column-II		Column-III	
(I)	Wheat	(a)	*Homo*	(i)	Monoco-tyledonae

(II)	Man	(b)	*Musca*	(ii)	Dico-tyledonae
(III)	Mango	(c)	*Mangifera*	(iii)	Insecta
(IV)	Housefly	(d)	*Triticum*	(iv)	Mammalia

(1) I-d-i, II-a-iv, III-c-ii, IV-b-iii

(2) I-d-i, II-c-ii, III-a-iv, IV-b-iii

(3) I-d-ii, II-c-i, III-a-iv, IV-b-iii

(4) I-a-iv, II-d-i, III-b-iii, IV-c-ii

5) Identify the correct statements from the following and select the correct option from option given below

A. One genus may have more than one specific epithet representing different species.

B. One specific epithet can be present in different genus.

C. Scientific term for convenient categories used in taxonomy is taxa/taxon

D. Cats, dogs, mammals and animals are different taxa.

(1) A and D only

(2) A, C and D only

(3) A, B and D only

(4) A, B, C and D

6) Arrange the following different taxon in ascending sequence according to their rank.

A. Poaceae   B. Polymoniales

C. Panthera   D. Monocotyledonae

(1) C – A – B – D

(2) D – C – B – A

(3) C – B – A – D

(4) D – B – A – C

7) Given below is a characteristics of the four kingdoms with four blanks (A-D), identify the blanks :-

	Monera	**Protista**	**Fungi**	**Plantae**
Cell wall	Peptidoglycan	Present in some	B	Present (cellulose)
Nuclear membrane	A	Present	Present	Present
Body organisation	Cellular	Cellular	Multicellular	D
Mode of nutrition	Autotrophic, heterotrophic	C	Heterotrophic	Autotrophic

(1) A-Absent, B-Cellulose, C-Autotrophic, D-Tissue/organ/organ system

(2) A-Present, B-Non-cellulosic, C-Heterotrophic, D-Cellular

(3) A-Absent, B-Chitin, C-Autotrophic and heterotrophic, (D)-Tissue/organ

(4) A-Present, B-Peptidoglycan,
C-Heterotrophic, D-Cellular

8) Choose the incorrect statement from following :-

(1) Ribosomes are the site of protein synthesis
(2) Pili do not play a role in motility
(3) Inclusion bodies are bounded by membrane
(4) Cell wall prevent the bacterium from bursting and collapsing

9) Single protective unit of bacteria are made up of:-

(1) Cell wall, cell membrane, Cytoplasm
(2) Glycocalyx, Cell membrane, Cytoplasm
(3) Glycocalyx, Cell wall, Cell membrane
(4) Flagella, Pili, Glycocalyx

10) Which of the following structure is responsible to attach the bacteria to host tissues and to rocks in streams ?

(1) Longer Pili
(2) Flagella
(3) Capsule
(4) Fimbriae

11) **Assertion :** Lichens are symbiotic association in between algae and fungi where algae is known as phycobiont and fungi is known as mycobiont.
Reason : In lichen algae is autotrophs and absorb water and nutrient from soil while fungi is heterotrophs and synthesize food for it self as well as for algae.

(1) Both Assertion and Reason are true but Reason is NOT the correct explanation of Assertion.
(2) Assertion is true but Reason is false.
(3) Assertion is false but Reason is true.
(4) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
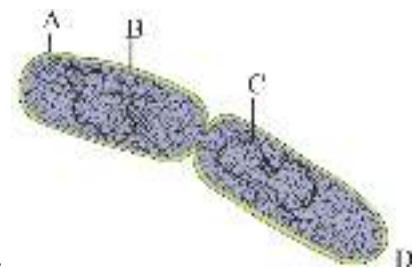
12) Identify the labelled A, B, C and D in the following figure.

(1) A–Plasma membrane, B–Cell wall,
C–RNA, D–Spore formation

(2) A–Plasma membrane, B–Mucilaginous sheath,
C–DNA, D–Transformation

(3) A–Mucilaginous sheath, B–Cell membrane,
C–RNA, D–Conjugation

(4) A–Cell wall, B–Cell membrane,
C–DNA, D–Binary fission

13) Which of the following set of diseases are caused by bacteria?

 (1) Cholera, Typhoid, Citrus canker

 (2) Cholera, Typhoid, Small pox

 (3) Tetanus, Herpes, Cholera

 (4) Tetanus, Typhoid, Mad cow disease

14) Read the following point carefully.
(a) Nitrogen fixation ability
(b) Oxygenic photosynthesis
(c) Colonies are generally surrounded by gelatinous sheath
(d) Cause water bloom
These points are related with-

 (1) Eubacteria

 (2) Euglenoids

 (3) Green algae

 (4) Cyanobacteria

15)

Consider the following statements about *Mycoplasma* :
(I) That completely lack a cell wall
(II) Mycoplasma is the smallest living organism
(III) They can not survive without oxygen
(IV) Many mycoplasma are pathogenic in animals and plants.

Which of the statements given above are **correct**?
 (1) I, II and III

 (2) II, III and IV

 (3) I, II and IV

 (4) I, III and IV

16) Which of the following statement is incorrect regarding archaebacteria ?

 (1) They can be present in the gut of several ruminant animals such as cows and buffaloes

 (2) They are responsible for the production of methane (biogas) from the dung

 (3) They can live in extreme salty areas, hot springs and marshy areas

 (4) Archaebacteria have similar cell wall structure like eubacteria

17) Find the incorrect statements from the following:- (A) Bacteria are the sole member of kingdom
Monera (B) Bacteria show the most extensive metabolic diversity
(C) The vast majority of bacteria are autotrophs and a few are heterotrophs

(D) Bacterial cell wall is made up of lipoprotein

(1) Only A, B & C
(2) Only C & D
(3) Only A, C & D
(4) Only B & C

18) In ascomycetes and basidiomycetes, the ascospores and basidiospore are produced respectively :-

(1) Exogenously and endogenously
(2) Endogenously and endogenously
(3) Exogenously and exogenously
(4) Endogenously and exogenously

19) In the list given below maximum members are of which kingdom according to five kingdom system ?
Rhizobium, Azolla, Gonyaulax, Euglena, Frankia, Nostoc, Aspergillus, Porella, Chlorella, PPLO, Anabaena

(1) Protista
(2) Monera
(3) Fungi
(4) Plantae

20) Read the following statements (A-D) and choose the correct options.
(A) Though the bacterial structure is very simple, they are very complex in behaviour.
(B) Archaebacteria differ from other bacteria in having a different cell wall structure.
(C) The cyanobacteria have 'chlorophyll-a' simillar to green plants.
(D) Eubacteria play a great role in recycling of nutrients like nitrogen, posphorous, iron and sulphur.

(1) A, B correct and C, D incorrect.
(2) A, C, D correct and A incorrect.
(3) C, D correct and A, B incorrect.
(4) A, B, C and D correct.

21) Choose the correct statement :-

(1) *E.coli* show amphitrichous nature
(2) *Rhodospirillum* is an example of purple sulphur bacteria
(3) *Acetobacter aceti* is an example of facultative anaerobic
(4) *Nitrosomonas* and *Nitrobacter* are example of nitrogen fixating bacteria.

22) Find out the incorrect match of the following :

(1) Eubacteria - True bacteria
(2) Archaebacteria - production of methane

(3) Cyanobacteria - cell wall of heterocyst is thin & made up of lignin

(4) Mycoplasma - Pathogenic in animals & plants

23) Which option is related with only and only monera not related with other kingdom of R. H. Whittaker

(1) Decomposer nature

(2) Presence of cell wall and cell membrane

(3) Multicelluar body

(4) Nitrogen fixation ability with prokoryotic nature

24) Cyanobacteria, mycoplasma and archaebacteria are similar in the presence of?

(1) Photosynthetic pigments

(2) N_2 – fixation structure

(3) Types of ribosomes

(4) Structure of cell membrane

25) Consider the followings- *Solanum tuberosum, Mangifera indica, Triticum aestivum, Solanum nigrum, Panthera leo, Panthera pardus, Solanum melongena, Panthera tigris, Musca domestica* How many family, genus and species are represented by above set of organisms?

(1) 5, 5, 5 respectively

(2) 5, 5, 9 respectively

(3) 9, 6, 5 respectively

(4) 6, 5, 9 respectively

26) Read the following terms carefully.
Cilia, Flagella, Zygote, Photosynthesis, Pellicle, Peptidoglycan wall, Nitrogen fixation ability, Multicellular, Heterocyst, Tissue, Pseudopodia. How many terms are not related with kingdom protista ?

(1) 4

(2) 5

(3) 7

(4) 6

27) An organism which have photosynthetic nature with cell wall like lids of soap box also have -

(1) chl a and b pigment

(2) Leucosin and fat (oil) stored food

(3) Sporangia formation

(4) Flagella for movement

28) Which organism are responsible for red appearance of sea by their rapid multiplication?

(1) *Euglena*

(2) *Noctiluca*

(3) *Gonyaulax*

(4) *Trypanosoma*

29) Identify the group of organism on basis of given characters :-
(A) Presence of two flagella.
(B) Holophytic nutrition.
(C) Cell wall with cellulosic plates.
(D) Mostly marine.

(1) Euglenoids

(2) Chrysophytes

(3) Slime moulds

(4) Dinoflagellates

30) The walls are embedded with silica and thus the walls are indestructible in :-

(1) Slime moulds

(2) Euglenoids

(3) Diatoms

(4) Dinoflagellates

31) Which option is not related to Euglenoids ?

(1) Majority of them are fresh water organisms, found in stagnant water.

(2) The pigments are identical to those present in higher plants

(3) When deprived of sunlight they behave like heterotrophs

(4) Most of them have two flagella; one lies longitudinally and the other transversely

32) Slime moulds are _____(i)_____protists. The body moves along decaying twigs and leaves engulfing organic material under suitable conditions, they form an aggregation called_____(ii)_____which may grow and spread over several feet.
In above question (i) & (ii) are respectively.

(1) (i) Autotrophic, (ii) plasmodium

(2) (i) Chemosynthetic autotrophic, (ii) plasmodium

(3) (i) Saprophytic, (ii) Phycobiont

(4) (i) saprophytic, (ii) plasmodium

33) Two statements regarding protozoa is given below. Read these statements carefully and identify the correct option from options given below :
Statement I : Protozoa is classified in kingdom Protista by R. H. Whittaker, which was previously classified in kingdom animalia by Carolus Linnaeus due to absence of cellulosic cell wall
Statement II : Cell wall is completely absent in members of protozoa although some amoeboidal protozoans present in fresh water have silica shell outside body

(1) Statement I is true while II is false

(2) Statement I is false while II is true

(3) Both Statement-I and Statement-II are true

(4) Both Statement-I and Statement-II are false

34) Choose the incorrect statement from following:-

(1) Yeast are used to make bread and bear.

(2) Fungi prefer to grow in warm and humid places.

(3) Cell wall of fungi is composed of chitin and polysaccharides.

(4) Fungi show symbiotic association with algae as mycorrhiza and with roots of higher plants as lichens.

35) A group of college student orderd a pizza with pineapple, onion and Mushroom. Mushroom belong to which kingdom ?

(1) *Agaricus*

(2) Ascomycetes

(3) Fungi

(4) Basidiomycetes

36) In Ascomycetes and Basidiomycetes, the intervening period between plasmogamy and karyogamy is known as :-

(1) Diplophase

(2) Dikaryophase

(3) Interphase

(4) Resting phase

37) Choose the incorrect statement about phycomycetes.

(1) Members are found in aquatic habitat also

(2) Spores are endogeneous produced in sporangium

(3) A zygospore is formed by reduction division

(4) They show all type of sexual reproduction

38)

Which of the following fungi is used extensively in biochemical and genetic work ?

(1) *Alternaria*

(2) *Aspergillus*

(3) *Neurospora*

(4) *Claviceps*

39)

Identify the organism and feature associated with it :-

 (1) *Morchella* - Edible fungus

 (2) *Agaricus* - Edible fungus

 (3) *Rhizopus* - Bread mold

 (4) *Alternaria* - Pathogenic fungus

40) Which option is associated with Basidiomycetes?

 (1) Rust, smut, Ergot

 (2) Rust, Smut, Mushroom

 (3) Yeast, Rust, Puff balls

 (4) Yeast, Smut, Mushroom

41) Many members of this class are decomposers of litter, and its examples are *Alternaria, Colletotrichum and Trichoderma.* This class is :-

 (1) Psilopsida

 (2) Basidiomycetes

 (3) Chlorophyceae

 (4) Deuteromycetes

42) Choose the incorrect match :-

 (1) Ascomycetes – Some members used in genetic work

 (2) Deuteromycetes – Rust and smut fungi

 (3) Basidiomycetes – Lack sex organs

 (4) Phycomycetes – Produce zoospore and Oospore

43) Read the following statements :-
(A) Lichens do not grow in polluted areas.
(B) Viroids have low molecular weight DNA
(C) Virus are inert outside their specific host cell.
(D) AIDS, small pox and cholera disease caused by Bacteria.
Which statements are correct ?

 (1) A and B

 (2) A and C

 (3) A, B and C

 (4) A, B and D

44) Which of the following is abnormally folded protein ?

(1) Viroids
(2) Mycorrhiza
(3) Prions
(4) Virus

45) Mycorrhiza is :-

(1) A fungus parasiting root system of higher plants.
(2) An association of *rhizobium* with roots of leguminous plants
(3) A symbiotic association of plant roots and certain fungi
(4) An association of algae with fungi

46) Which is a correct match for the animal and its common name ?

(1) *Obelia* – Jelly fish
(2) *Taenia* – Tapeworm
(3) *Neries* – Earthworm
(4) *Pila* – Pearl oyster

47) Which is not a character of cartilaginous fishes?

(1) 2- Chambered heart
(2) Paired fins
(3) Air or swim bladder
(4) Gills without operculum

48) Metagenesis means :-

(1) Polyp produce medusae asexually and medusae produce polyp sexually
(2) Polyp produce medusae sexually and medusae produce polyp sexually
(3) Polyp produce medusae asexually and medusae produce polyp asexually.
(4) Polyp produce medusae sexually and medusae produce polyp Asexually.

49) Which one is correct about Porifera :-

(1) Unisexual
(2) Internal fertilisation with indirect development
(3) External fertilisation with direct development
(4) External fertilisation with indirect development

50) Which of the following is exclusively marine :-

(1) Sea walnut
(2) *Amphioxus*

(3) *Ascidia*

(4) All above

51) Read the following (A-D) four statements :-
(A) Mouth is located ventrally
(B) Notochord is absent throughout the life
(C) Gill slits are absent
(D) Placoid scale present
How many of the above statements are correct for Chondrichthyes ?

(1) Four

(2) Three

(3) Two

(4) One

52) In which phylum the cells performing the same function are arranged into tissues for the first time ?

(1) Porifera

(2) Coelenterata

(3) Platyhelminthes

(4) Aschelminthes

53) The property of a living organism to emit light is found in :

(1) *Sycon*

(2) *Pleurobrachia*

(3) *Hydra*

(4) *Taenia*

54) The animal group where the adults are less developed but larvae are more developed is :-

(1) Agnatha

(2) Tunicate

(3) Amphibian

(4) Cephalochordates

55) The animals of which phylum are bilaterally symmetrical, triploblastic, segmented and coelomate ?

(1) Coelenterata

(2) Ctenophora

(3) Aschelminthes

(4) Arthropoda

56) Which of the following statement is incorrect for reptiles ?

(1) They have creeping or crawling mode of locomotion

(2) Heart is usually three chambered

(3) Snakes and lizards shed their scales as skin cast

(4) Fertilisation is external

57) In the given examples, how many animals are viviparous ? *Corvus, Columba, Macropus, Pteropus, Calotes, Hemidactylus, Psittacula, Struthio* and *Macaca*

(1) Three

(2) Four

(3) Five

(4) Six

58) In which one of the following the genus name, its two character and its class/phylum are correctly matched?

	Genus name		Two characters	Class/ Phylum
(1)	*Ascaris*	(a)	Body segmented	Annelida
		(b)	Males and females distinct	
(2)	Frog	(a)	A tympanum represents ear	Amphibia
		(b)	Fertilization is external	
(3)	*Pteropus*	(a)	Skin possesses hair	Mammalia
		(b)	Oviparous	
(4)	*Aurelia*	(a)	Cnidoblasts	Coelenterata
		(b)	Organ level of organization	

(1) 1

(2) 2

(3) 3

(4) 4

59) Fill in the blanks :-
In ....a...., the cells are arranged as loose cell aggregates, i.e., they exhibit ....b.... of organisation. Some division of labour (activities) occur among the cells :-

(1) a-sponges, b-cellular level

(2) a-coelentrates, b-tissue level

(3) a-platyhelminthes, b-organ level

(4) a-coelentrates, b-cellular level

60) Read the given statements and select the correct option.
Statement-1 : All triploblastic animals are eucoelomates.
Statement-2 : Diploblastic animals have a false coelom.

(1) Both statements 1 and 2 are correct.

(2) Statements 1 is not correct but statement 2 is correct.

(3) Statement 1 is correct and statement 2 is not correct.

(4) Both statements 1 and 2 are incorrect.

61)

How many of the following animals show organ/organ system level of body organisation along with bilateral symmetry ?

Pleurobrachia, Fasciola, Ancylostoma, Hirudinaria, Anopheles, adult *Cucumaria, Balanoglossus*

(1) Five

(2) Four

(3) Two

(4) Three

62)

Identify the organism from the following hints :-
(A) Fresh water habitat with streamlined body
(B) Two chambered heart

(C) Air bladder present to regulate buoyancy (D) Four pair of gill slits with operculum

(1) *Scoliodon*

(2) *Trygon*

(3) *Myxine*

(4) *Catla*

63) The excretory organ of hemichordates:

(1) Flame cells

(2) Solenocytes

(3) Kidneys

(4) Proboscis gland

64) In which of the following groups, all animals are monoecious?

(1) Tapeworm, *Neries, Pheretima*

(2) Leech, Tapeworm, Earthworm

(3) *Ascaris*, Tapeworm, Earthworm

(4) Star fish, *Pheretima, Sepia*

65) No. of cranial nerves in the animal shown in given diagram is :-

(1) 10

(2) 12 pairs

(3) 8 pairs

(4) 20

66) Which of the following combination of animals and it's description is incorrect ?

(1) Pila - Bilateral symmetrical

(2) Balanuglossus - Proboscis gland for excretion

(3) Echinus - With spiny body

(4) Balanoglossus - Closed type blood circulatory system

67) Feather like gills are present in :

(1) Annelida

(2) Echinodermata

(3) Hemichordata

(4) Mollusca

68) In which one of the following the genus name, its two character and its class are correctly matched :-

	Genus	Two character	Class / phylum
(1)	*Felis*	(a) External ears or pinnae are absent (b) Homeothermic	Mammalia
(2)	*Struthio*	(a) Pleurodont teeth (b) Endoskeleton fully ossified	Aves
(3)	*Bungarus*	(a) epidermal scales (b) Poisonous snake	Reptilia
(4)	*Ichthyophis*	(a) 2 pair of limbs present (b) Poikilothermic animal	Amphibia

(1) 1

(2) 2

(3) 3

(4) 4

69) Here two basic forms of coelenterates (*Obelia*) are given. Which one option is correct about
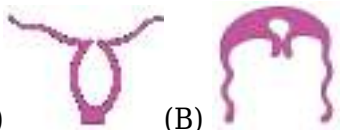
them? (A)   (B)

(1) (A) and (B) both are free swimmers

(2) (A) produce (B) asexually and (B) produce (A) sexually

(3) (A) is medusa and (B) is polyp

(4) (A) and (B) both are sessile

70) Which of the following option is correct about the figure given below ?

(1) Planeria

(2) Fasciola

(3) Ancylostoma

(4) Pleurobrachia

71) Match the following organism with their respective characteristics :-

(a)	Cnidoblast	I.	Pila
(b)	Comb plates	II.	Anapheles
(c)	Malpighian tubules.	III.	Physalia
(d)	Radula.	IV.	Ctenoplana

(1) a–III, b–IV, c–II, d–I

(2) a–I, b–III, c–IV, d–II

(3) a–IV, b–II, c–I, d–III

(4) a–II, b–IV, c–III, d–I

72) **Statement-I :-** Echinodermates have spiny body with Incomplete digestive system.
Statement-II :- Echinoderms are Triploblastic & radial symmetrical animals

(1) Statement-I is correct but Statement-II is incorrect

(2) Statement-I and Statement-II both are incorrect

(3) Statement-I is incorrect but Statement-II is correct

(4) Statement-I and Statement-II both are correct

73) Animal which was earlier considered as chordate but now is a non-chordate.

(1) Balanoglaussus

(2) Saccoglaussus

(3) Salpa

(4) Both (1) and (2)

74) Triploblastic and eucoeomate animals belong to which phylum?

(1) Annelida and Arthropoda

(2) Annelida and Hemichordata

(3) Echinodermata and Mollusca

(4) All of above phyla

75) Locomotory organ in Pleurobrachia is :

(1) Comb plate

(2) Cnidoblast

(3) Stinging cell

(4) Eight external rows of flagella

76)
The respiratory organ in above animal is ?

(1) Skin

(2) Lungs

(3) Gills

(4) Trachea

77) Which animals shed their skin as skin cast :

(1) Frog

(2) Lizard

(3) Snake

(4) 2 and 3 both

78) Which gland is present in Psittacula ?

(1) Sweat gland

(2) Mucos gland

(3) Mammary gland

(4) Oil gland

79) The most distinctive feature of Echinoderms is :-

(1) Water vascular system

(2) Water transport system

(3) Water canal system

(4) All of these

80) **Statement-I :** Digestion in sponges is intracellular.

Statement-II : Digestion in sponges take place in collar cells.

(1) Both Statement-I and Statement-II are correct.

(2) Both Statement-I and Statement-II are incorrect.

(3) Statement-I is correct but Statement-II is incorrect.

(4) Statement-I is incorrect but Statement-II is correct.

81) "Mantle" is the character of which animal.

(1) *Antedone*

(2) *Aplysia*

(3) *Aedes*

(4) *Ancylostoma*

82) Which of the following is member of Tetrapoda :

(1) Ascidia

(2) Amphioxus

(3) Clarias

(4) Ichthyophis

83) Which of the following characters is not shared by both cnidarians and ctenophores ?

(1) Tissue level of organisation

(2) Radial symmetry

(3) Digestion is extracellular and intracellular

(4) Reproduction takes place only by sexual means.

84) Internal fertilization and mostly viviparous animal group is :

(1) *Camelus*, Hippocampus

(2) *Exocoetus, Clarias*

(3) *Taenia, Ascaris*

(4) *Scoliodon, Pristis*

85) **Assertion :** Class osteichthyes includes both marine & fresh water fishes with bony endoskeleton and don't have to swim continuously.
Reason : Air bladder is present which regulates buoyancy.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.
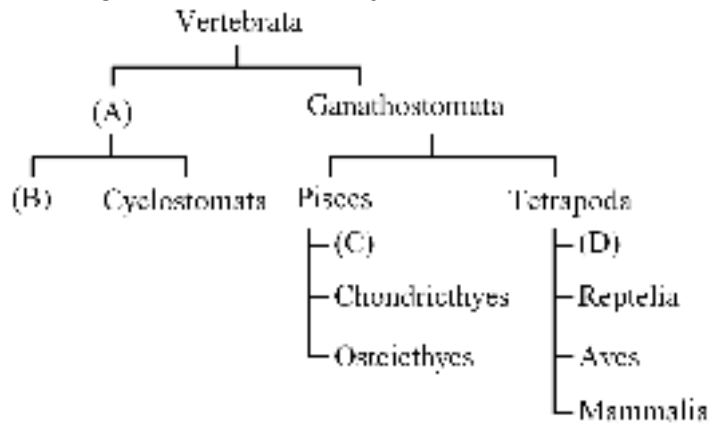
(4) Both Assertion & Reason are False.

86) Read the following statements :-
(A) Protochordates are exclusively marine
(B) In Cephalochordates, notochord extends from head to tail region.

(C) In Urochordates, notochord is present only in larval tail.
(D) Cranium and vertebral column are bony in Cyclostomates.
Which of the above statement is/are correct?

(1) A alone

(2) B, C and D

(3) A, B and C

(4) All

87) Read the following flow chart carefully and select the correct option for A, B, C and D

Vertebrata
├─ (A)
│   ├─ (B)
│   └─ Cyclostomata
└─ Gnathostomata
    ├─ Pisces
    │   ├─ (C)
    │   ├─ Chondrichthyes
    │   └─ Osteichthyes
    └─ Tetrapoda
        ├─ (D)
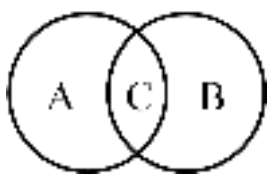   ├─ Reptelia
        ├─ Aves
        └─ Mammalia

respectively :-

(1) Ostracodermi, Agnatha, Placodermi, Amphibia

(2) Agnatha, Placodermi, Ostracodermi, Amphibia

(3) Agnatha, Ostracodermi, Placodermi, Amphibia

(4) Amphibia, Ostracodermi, Placodermi, Agnatha

88)

Observe the venn diagram shown below here :-

A = Bilateral symmetry
B = Radial symmetry
Based the provided information, identify the phylum A, B and C.

|	A	B	C
(1)	Porifera	Chordata	Mollusca
(2)	Chordata	Echinodermata	Coelenterata
(3)	Platyhelminthes	Coelenterata	Echinodermata
(4)	Annelida	Arthropoda	Mollusca

(1) 1

(2) 2

(3) 3

(4) 4

89) Which type of cavity found in coelenterata ?

(1) Spongocoel cavity

(2) Gastro Vascular cavity

(3) Water Vascular cavity

(4) Haemocoel cavity

90) Following are two categories of symmetry and germ layer given below. Choose an appropriate

(A)   (B)
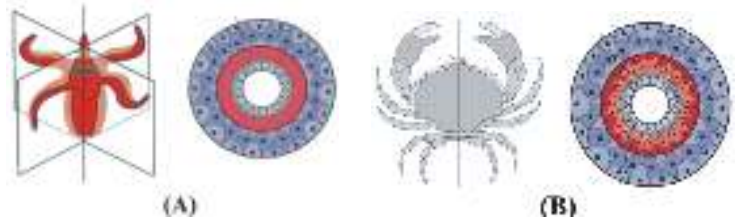
answer which belongs to the figures given :

	Category	Symmetry	Germ layer	Phylum
(1)	A	Radial	Diploblastic	Platyhelminthes
(2)	B	Bilateral	Triploblastic	Platyhelminthes
(3)	A	Bilateral	Diploblastic	Colenterata
(4)	B	Radial	Triploblastic	Annelida

(1) 1

(2) 2

(3) 3

(4) 4

ANSWER KEYS

PHYSICS

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A.	1	1	2	2	2	4	1	2	3	3	3	4	4	1	3	2	2	3	3	3
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	2	2	1	3	2	2	4	2	1	1	1	1	2	2	4	4	1	1	3	3
Q.	41	42	43	44	45															
A.	2	3	4	2	4															

CHEMISTRY

Q.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
A.	4	2	2	2	1	3	2	4	4	3	1	3	1	1	4	4	3	2	4	3
Q.	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
A.	2	4	3	4	4	2	2	1	4	3	3	1	1	4	4	3	1	4	2	3
Q.	86	87	88	89	90															
A.	1	2	4	4	3															

BIOLOGY

Q.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
A.	3	2	1	1	4	1	3	3	3	4	2	4	1	4	3	4	2	4	2	4
Q.	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
A.	3	3	4	3	2	2	2	3	4	3	4	4	1	4	3	2	3	3	2	2
Q.	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
A.	4	2	2	3	3	2	3	1	2	4	3	2	2	2	4	4	1	2	1	4
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
A.	1	4	4	2	4	4	4	3	2	3	1	3	4	4	1	2	4	4	1	1
Q.	171	172	173	174	175	176	177	178	179	180										
A.	2	4	4	4	1	3	3	3	2	2										

SOLUTIONS

PHYSICS

1)

Einstein's photoelectric equation is

$$\frac{hc}{\lambda} = eV_0 + W \quad ....(1)$$

According to given conditions

$$\frac{hc}{\lambda} = e(5V_0) + W \quad ....(2)$$

$$\text{and } \frac{hc}{2\lambda} = eV_0 + W \quad ....(3)$$

From (2) and (3), we get

$$\frac{5hc}{2\lambda} - \frac{hc}{\lambda} = 5W - W \quad \text{or} \quad 4W = \frac{3hc}{2\lambda} \quad \text{or} \quad W = \frac{3hc}{8\lambda}$$

or $\frac{hc}{\lambda_0} = \frac{3hc}{8\lambda} \Rightarrow \lambda_0 = \frac{8}{3}\lambda$

2)

theoretical fact.

3)

$$\because k_{max} = h\nu - h\nu_0$$
$$k_1 = h\nu_1 - h\nu_0 \quad ...(1)$$
$$k_2 = h\nu_2 - h\nu_0 \quad ...(2)$$
$$\frac{k_1}{k_2} = \frac{\nu_1 - \nu_0}{\nu_2 - \nu_0} = \frac{1}{k} \Rightarrow k\nu_1 - k\nu_0 = \nu_2 - \nu_0$$
$$\nu_0 = \frac{k\nu_1 - \nu_2}{k - 1}$$

4)

$$P = IA = 150 \times 10^{-3} \times 4 \times 10^{-4}$$
$$= 6 \times 10^{-5}$$
$$n = \frac{PA}{nC} = \frac{6 \times 10^{-5} \times 3 \times 10^{-7}}{2 \times 10^{-25}}$$
$$= 9 \times 10^{13}/s$$

5) Stopping potential does not depend on the relative distance between the source and the photo cell.

6) $E = \frac{hc}{\lambda} = \frac{12400 \text{Å} eV}{2500 \text{Å}} = 4.96eV \approx 5eV$

∴ $KE_{max} = E - \phi_0$ (∵ $\phi_0 = 6.2$ eV given)

= 5 eV – 6.2 eV

KE_{max} = – 1.2 eV (Not possible)

K.E. is always positive.

(∴ P.E.E. is not valid)

7) $p = \dfrac{h}{\lambda}$

K.E. = $\dfrac{p^2}{2m} = \dfrac{h^2}{2m\lambda^2}$

If entire K.E. of electron is converted into photon then

$\dfrac{h^2}{2m\lambda^2} = \dfrac{hc}{\lambda_0}$ $\lambda_0 = \dfrac{2mc\lambda^2}{h}$

8) $K_{max} = \left[\dfrac{12400}{5000} - 2.44\right]$ eV

K_{max} = 0.04 eV

$\lambda = \dfrac{12.27}{\sqrt{0.04}} = 6.135 \times 10^{-9}$ m

9)

CoLM $R = R_0 A^{\frac{1}{3}}$ $R_1 : R_2 = 3 : 1$

$\dfrac{m_1}{m_2} = \dfrac{V_2}{V_1}$ $\dfrac{R_1}{R_2} = \left(\dfrac{A_1}{A_2}\right)^{\frac{1}{3}}$

$\dfrac{m_1}{m_2} = \dfrac{27}{1}$ $\dfrac{R_1}{R_2} = \left(\dfrac{27}{1}\right)^{\frac{1}{3}}$

10)

Theory Based

11) $^{226}_{88}\text{Ra} \rightarrow\,^{206}_{82}\text{Pb}$
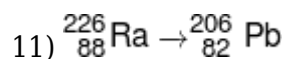
no. of α = $\dfrac{226 - 206}{4} = 5$

no. of β = 82 – (88 – 5 × 2) = 4

12)

Atomic mass of product = A – 12

Atomic number of product = Z – 6 + 5 = Z – 1

No. of neutrons = (A – 12) – (Z – 1) = A – Z – 11

No. of protons = Z – 1

13) $p = \dfrac{hv}{c}$

$\Rightarrow v = \dfrac{pc}{h} = \dfrac{3.3 \times 10^{-29} \times 3 \times 10^8}{6.6 \times 10^{-34}}$

$= 1.5 \times 10^{13} Hz$

14)

Q = 8.4 (139 HW) – 7.5 × 239

   = 239 [8.4 – 7.5]

   = 239 × 0.9

   = 215.1 MeV

15)

$Q = BE_f - BE_i$

$= 16 \times 7.97 - 17 \times 7.75$

$= -4.23$ MeV

So 4.23 MeV energy required

16)

$n\lambda = 2\pi r_n$

$3\lambda = 2 \times 3.14 \times \dfrac{0.53 \times (3)^2 Å}{(1)}$

$\lambda = 10 Å$

17) In electric field photoelectron will experience force and accelerate opposite to the field so it's KE increases (i.e. stopping potential will increase), no change in photoelectric current.

18) $E_{photon} = \left(-\dfrac{13.6}{9}\right) eV - (-13.6 \text{ eV}) \approx 12.1 \text{ eV}.$

$eV_0 = 12.1 \text{ eV} - 5.1 \text{ eV} \Rightarrow V_0 = 7V$

19) $\dfrac{\Delta\lambda}{\lambda} \times 100 = \dfrac{\Delta p}{p_i} \times 100$

$\dfrac{P}{p_i} \times 100 = 0.5$

$\Rightarrow p_i = 200 \text{ P}$

20)

As $V_{0_C} > V_{0_B}$ and $V_{0_B} > V_{0_A}$

$\therefore \quad v_C > v_B \qquad v_B > v_A$

$\therefore \quad \lambda_C < \lambda_B \qquad \therefore \lambda_B < \lambda_A$

$\qquad \lambda_C < \lambda_B < \lambda_A$

21) $\lambda = \dfrac{\lambda}{\sqrt{2mE}}$

$\dfrac{\lambda_1}{\lambda_2} = \sqrt{\dfrac{E_2}{E_1}}$

$\dfrac{\lambda_1}{\lambda_2} = \sqrt{\dfrac{144}{100}} = \dfrac{12}{10} = \dfrac{6}{5}$

$\dfrac{\Delta\lambda}{\lambda}\%$

$\left|\dfrac{5}{6} - 1\right| \times 100\%$

$= \dfrac{-100}{6} = -16.6\%$

Wavelength decreases by
16.6%

22) ∵ V = same   so $\lambda = \dfrac{h}{\sqrt{2mqV}}$

$h \propto \dfrac{1}{\sqrt{mq}}$

$\dfrac{\lambda_p}{\lambda_\alpha} = \sqrt{\dfrac{m_\alpha q_\alpha}{m_p q_p}}$

$= \sqrt{\dfrac{4m_p 2q_p}{m_p q_p}} = \sqrt{\dfrac{8}{1}} = \dfrac{2\sqrt{2}}{1}$

23) $\phi = h\nu_0$

No emission if $\nu < \nu_0$

$\nu_0 = \dfrac{\phi}{h}$

$\nu < \dfrac{\phi}{h}$

24)

E = nhν

here E is same so $\quad n \propto \dfrac{1}{\nu} \Rightarrow \dfrac{n_1}{n_2} = \dfrac{\nu_2}{\nu_1} = \dfrac{\gamma_2}{\gamma_1}$
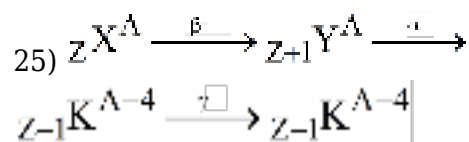
25) $_{Z}X^{A} \xrightarrow{\ \beta\ } _{Z+1}Y^{A} \xrightarrow{\ \ }$

$_{Z-1}K^{A-4} \xrightarrow{\ \ } _{Z-1}K^{A-4}$

26)

y = sinx

$$A_1 = \int_0^{\pi} \sin x\, dx$$

| Total Area

$$= [-\cos x]_0^{\pi}$$

| from 0 to 3π

| $= 2 - 2 + 2$

$$= -\cos \pi + \cos\theta$$ | $= 2$ Ans(2)

$$= -(-1) = 1$$ |

$$= 2$$

27)
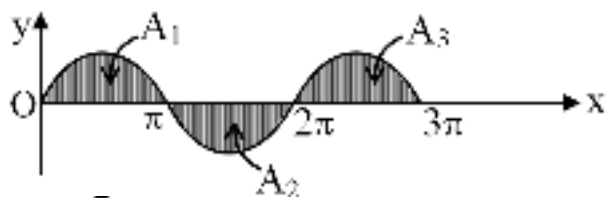
$$\Box\ y = x^2 + 1$$
$$\frac{dy}{dx} = (2x)$$
at $x = 2$
Slope $= 2(2) = 4$

28) $$V = \frac{4}{3}\pi r^3$$
$$\frac{dv}{dt} = \frac{4}{3}\pi \cdot 3r^2 \frac{dr}{dt}$$
$$4 = 4\pi r^2 \frac{dr}{dt}$$
$$A = 4\pi r^2$$
$$\frac{dA}{dt} = 4\pi \cdot 2r \frac{dr}{dt}$$
$$= 2r \times \frac{4}{r^2} = \frac{8}{r}$$

29)

$$S_\infty = \frac{a}{1-r}$$ | $T_n = ar^{n-1}$

$$12 = \frac{8}{1-r}$$ | So 4th term

$$r = \frac{1}{3}$$ $T_4 = (8)\left(\frac{1}{3}\right)^3 = \frac{8}{27}$
|

30)

$$\log_{10}32 = \log_{10}(2)^5 = 5\log_{10}2$$
$$= 5 \times 0.301$$
$$= 1.505$$

31) $(0.97)^{\frac{1}{3}} = (1 - 0.03)^{\frac{1}{3}}$

$\approx 1 - \frac{1}{3}(0.03)$

$\approx 1 - 0.01$

≈ 0.99

32) $y = \sqrt{x}$

33)
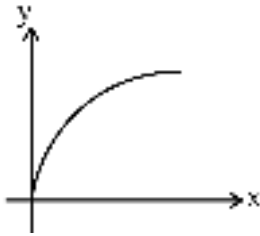
$y = \ln(3x^2 + 1)$

$\frac{dy}{dx} = \frac{1}{(3x^2 + 1)}\frac{d}{dx}(3x^2 + 1)$

$= \frac{6x}{3x^2 + 1}$
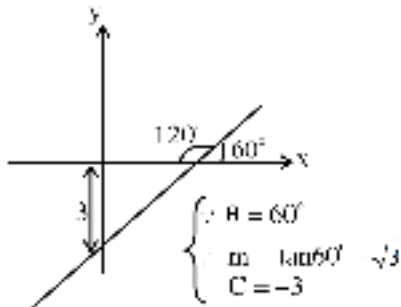
34)
equation of st. line

$y = mx + c$

$y = \sqrt{3}x - 3$

or

$\sqrt{3}y = 3(x - \sqrt{3})$

35)

$(1.01)^3 = a \Rightarrow a = (1 + 0.01)^3$

$= 1 + 3(0.01)$

$= \boxed{a = 1.03}$

$(1.02)^2 = b \Rightarrow b = (1 + 0.02)^2$

$b = 1 + 2(0.02)$

$= \boxed{b = 1.04}$

then b − a = 0.01

36)

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-0}{0-5} = -\frac{3}{5}$$

37) $\vec{d} = (14-3)\hat{i} + (13-2)\hat{j} + (9+6)\hat{k}$
$\vec{d} = (11\hat{i} + 11\hat{j} + 15\hat{k})cm$
$\vec{d} = (4\hat{i} + \hat{j} + 3\hat{k})N$
Now $w = \vec{F}.\vec{d}$
$w = (44 + 11 + 45)\dfrac{1}{100}$
$w = 1J$

38) $W_{all} = \Delta K$
$W_g + W_f + W_{sp} = 0$
$mgR - \mu mgx - \dfrac{1}{2}Kx^2 = 0$ (x = 2m)
$\mu = 0.5$

39)

$U_1 = 25J$
$U_2 = 25 + 75 = 100\ J$
$U \propto x^2$
$\dfrac{100}{25} = \left(\dfrac{x}{2}\right)^2$
$x = 4$
⇨ Further extended by 4 – 2 = 2cm

40) $F = a + bx^2$
$\text{Work done} = \displaystyle\int Fdx$
$5 = \displaystyle\int \left(a + bx^2\right) dx$
$5 = ax + \dfrac{bx^3}{3}\Big|_0^1$
$5 = a + \dfrac{b}{3}$ [a = 1]
$4 = \dfrac{b}{3} \Rightarrow b = 12N/m^2$

41)

$W_1 = W_2$
$(F_1 \cos 45^o)d = (F_2 \cos 60^o)d$
$F_1 \times \dfrac{1}{\sqrt{2}} = F_2 \times \dfrac{1}{2}$

$$\frac{F_1}{F_2} = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$$

42) $\omega_g + \omega_{air} = KE_f - KE_i$

$-mgh + \omega_{air} = 0 - \frac{1}{2}mv_1^2$

$- 0.8 \times 10 \times 16 + \omega_{air} = - \frac{1}{2} \times 0.8 \times (20)^2$

$w_{air} = - 160 + 128 = - 32J$

43) NCERT Pg # 47

$$\int_{-10}^{20} \frac{2}{y}dy = KE_F - \frac{1}{2} \times 1.2 \times (4)^2$$

$+ 2 [\ell ny]_{10}^{20} = -KE_F + 9.6$

$KE_F = 9.6 - 2ln2 \Rightarrow 9.6 - 1.4$

$KE_F \Rightarrow 8.2 \ J$

44) $KE_i \xrightarrow{44\%\uparrow} KE_f$
100   144

$\because KE = \frac{p^2}{2m}$

$\because p \propto \sqrt{KE}$

$\Rightarrow \frac{p_2}{p_1} = \sqrt{\frac{KE_f}{KE_i}} = \sqrt{\frac{144}{100}} = \frac{12}{10}$

$p = \frac{p_2 - p_1}{p_1} \times 100 = 20\%$

$\Rightarrow$ % Increase is

45)

By I equation of motion

$V = 0 + at_1 \Rightarrow \boxed{a = \frac{V}{t_1}}$

then velocity after time "t"

$V' = 0 + at \Rightarrow \boxed{V' = at}$

Now

$W = \Delta KE$

$W = KE_f - KE_i$

$W = \frac{1}{2}MV'^2$

$W = \frac{1}{2}M(at)^2$

$= \frac{1}{2}M\left(\frac{V}{t_1}.t\right)^2$

$$= \frac{1}{2}M\left(\frac{V^2}{t_1^2}\right).t^2$$

CHEMISTRY

46) **Explaining :** Order of the traction determined by the Given rate.
Concept : This Question is based on Rate law.
Solution : Order wrt P is 1 and Order wrt Q and R is 0.5
Total order of reaction = 1 + 0.5 + 0.5 = 2
Final Answer : (4)

47) $\pm\dfrac{\Delta c}{\Delta t} = \pm\dfrac{\Delta P}{\Delta t} \times \dfrac{1}{RT}$

48) $\dfrac{1}{2} \times (ROD)_{MnO_2^-} = \dfrac{1}{5} \times (ROD)_{NO_2^-}$

$(ROD)_{NO_2^-} = \dfrac{5}{2} \times (ROD)_{MnO_4^-}$

$= \dfrac{5}{2} \times 0.024 \quad = 5 \times 0.012$

$= 0.06 \text{ ms}^{-1} = 6 \times 10^{-2} \text{ ms}^{-1}$

49)

NCERT Pg.No.99

50)

$ROR = -\dfrac{\Delta S_2O_8^{2-}}{\Delta t} = -\dfrac{\Delta I^-}{\Delta t} \times \dfrac{1}{3}$

51)

A + 2B → P-elementary reaction

$r = -\dfrac{d[A]}{dt} = -\dfrac{1}{2}\dfrac{d[B]}{dt} = k[A][B]^2$

52)

Concept :- rate expression in terms of ROD & ROA.
Solution :- $2SO_2 + O_2 \rightarrow 2SO_3$

$r = \dfrac{1}{2}\left(-\dfrac{d[SO_2]}{dt}\right) = \dfrac{1}{2}\left(+\dfrac{d[SO_3]}{dt}\right)$

$\left(-\dfrac{d[SO_2]}{dt}\right) = \dfrac{1}{2} \times 2 \times \dfrac{0.8}{80} \times 64 =$ 0.64 g/min

Answer :- 2

53)

$r = k[M][Z]$ .....(i)

$\downarrow$

I

$[M]$

$k_c = \overline{[X][Y]} \Rightarrow [M] = K_c[X][Y]$ ...(ii)

from (i) & (ii)

$r = KK_c [X][Y][Z] = k'[X][Y][Z]$

54)

Unst of x for Ist order reaction is time^{-1}

55) NCERT (4.4)

$r = \dfrac{\Delta P}{\Delta T} = \dfrac{bar}{min} = bar\ min^{-1}$

$r = K [P_{CH_3OCH_3}]^{3/2}$

$bar\ min^{-1} = K(bar)^{3/2}$

$K = bar^{-1/2}\ min^{-1}$

56) **Relevant Formulas:** First order integrated rate law: $kt = \ln\left(\dfrac{P_0}{P_A}\right)$ where: - P_0 is the initial partial pressure of A, - P_A is the partial pressure of A at time t, - k is the rate constant, - t is the time elapsed.

Step-by-Step Calculation: 1. Let the extent of reaction in pressure units at time t be x, so partial pressures are: $P_A = P_0 - x, \quad P_B = 3x, \quad P_C = x$ 2. The total pressure at time t is:

$P_t = P_A + P_B + P_C = (P_0 - x) + 3x + x = P_0 + 3x$ Solving for x: $x = \dfrac{P_t - P_0}{3}$ 3. Applying the

integrated rate law for first order: $kt = \ln\dfrac{P_0}{P_A} = \ln\dfrac{P_0}{P_0 - x}$ 4. Substitute x:

$P_0 - x = P_0 - \dfrac{P_t - P_0}{3} = \dfrac{4P_0 - P_t}{3}$ Hence, $kt = \ln\dfrac{P_0}{(4P_0 - P_t)/3} = \ln\dfrac{3P_0}{4P_0 - P_t}$

So the integrated rate equation is: $kt = \ln\left(\dfrac{3P_0}{4P_0 - P_t}\right)$ **OR** $A_{(g)} \rightarrow 3B_{(g)} + C_{(g)}$

$P_0 \quad \rightarrow \quad 0 \quad\quad 0$

$(P_0 - x) \rightarrow 3x \quad\quad x$

$P_t = P_0 - x + x + 3x$

$3x = P_t - P_0$

$x = \dfrac{P_t - P_0}{3}$

$$P_{0-x} = \frac{3P_0 - P_t + P_0}{2} = \frac{4P_0 - P_t}{3} \qquad K = \frac{2.303}{t} \text{ by } \frac{3P_0}{4P_0 - P_t}$$

57)

$r = K[A][B]$ ...(i)

↓

I

$$K_c = \frac{[A]^2}{[A_2]} \Rightarrow [A] = (K_C)^{\frac{1}{2}}(A_2)^{\frac{1}{2}}$$

$r = K\sqrt{K_C}(A_2)^{\frac{1}{2}} (B_2)$

order = $1\frac{1}{2}$

58)

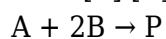order = $\frac{3}{2} - \frac{1}{2} = 1$

59)

$r = k[A][B]^2$

60)

$r = K[A] [B]^2$
A + 2B → P
0.1 0.2 → 0
(0.1 – x (0.2 – 2x) → x
0.05 0.1 → 0.05
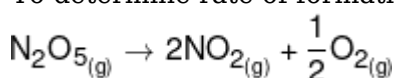$r = 2 \times 10^{-6} \times 0.05 \times (0.1)^2$
$r = 10^{-9}$ Ms^{-1}

61) rate = k[A]

$$k = \frac{rate}{[A]} = \frac{7.5 \times 10^{-4}}{0.2}$$

3.75×10^{-3} s^{-1}

62) **Question Explanation :**
To determine rate of formation of NO_2 and O_2 in given reaction

$$N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$$

Given Data :
Rate of disappearance of N_2O_5
= 6.25×10^{-3} mol ⬜$^{-1}$s^{-1}
Concept :

rate $= -\frac{d}{dt}[N_2O_5] = \frac{1}{2}\frac{d}{dt}[NO_2] = 2.\frac{d}{dt}[O_2]$

63)

Since $x_1 << x_2$ so I^{st} step is RDS
$r = K_1[X][Y]$
order $= 2$

64)

$r = K[NO]^2[O_2]$
$\therefore K = \dfrac{0.028}{(0.01)^2 (0.04)} = 7 \times 10^3 \ L^2 mol^{-2}s^{-1}$

65)

Since $\dfrac{t_1}{2}$ vs a is straight line with (+) as slope so zero order reaction
So $(ROD)_A = r = k[A]^0$

66) $-\dfrac{1}{x}\dfrac{d(A)}{dt} = +\dfrac{1}{y}\dfrac{d(B)}{dt}$

$-\dfrac{d(A)}{dt} = \left(\dfrac{x}{y}\right)\dfrac{d(B)}{dt}$

$\log\left(\dfrac{-d(A)}{dt}\right) = \log\dfrac{x}{y} + \log\dfrac{d(B)}{dt}$ ...(i)

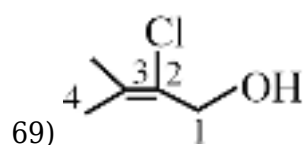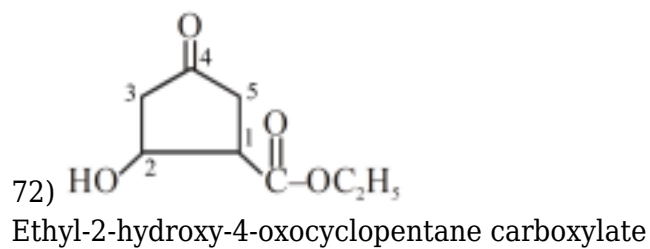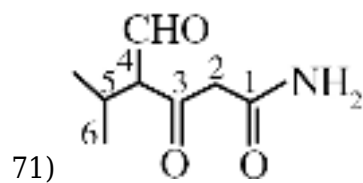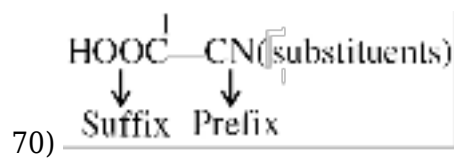So $\log\dfrac{x}{y} = \log 2 \Rightarrow \dfrac{x}{y} = 2$

67)

order $= \dfrac{1}{3} + \dfrac{1}{4} + \dfrac{1}{2} = \dfrac{4+3+6}{12} = \dfrac{13}{12}$

68) $r = (ROD)_{N_2} = \dfrac{1}{3}(ROD)_{H_2} = \dfrac{1}{2}(ROD)_{NH_3}$

$r = \dfrac{1}{2} \times 2.5 \times 10^{-4} = 1.25 \times 10^{-4} \ Ms^{-1}$

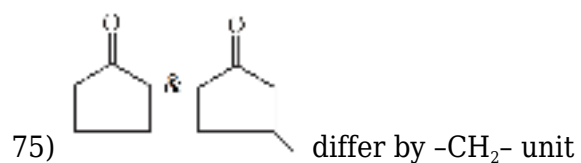$(ROD)_{H_2} = \dfrac{3}{2} \times 2.5 \times 10^{-4} = 3.75 \times 10^{-4}$

69)

70)

$$HOOC \overset{|}{\underset{\downarrow}{}} CN(substituents)$$

Suffix Prefix

71)

72) Ethyl-2-hydroxy-4-oxocyclopentane carboxylate

73) Reference NCERT-XI, Pg. # 399

74)

Aldehyde not present in structure.

75)

  differ by –CH$_2$– unit

76)

Select correct numbering.

77)

78)
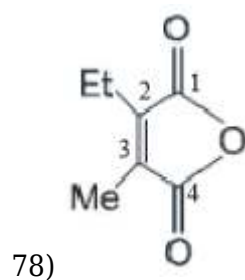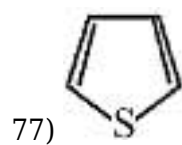
2-Ethyl-3-methylbut-2-ene-1, 4-dioic anhydride

79)

NCERT XII # Amine chapter

80)

NCERT XII # Alkylhalide
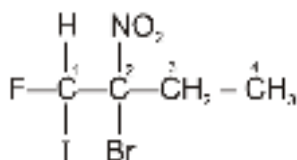
81)

sp^3 hybridised → 4σ bond

82)

Theory base question

83)

Select correct PCC

84)

Data base

85)
(2-Bromo-1-fluoro-1-iodo-2-nitrobutane)

86)

5 – 3 = 2

87)

Select PFG and perfix

88)

3° Amine

89)

NCERT XII # Carbonyl compound

90)

Select correct P.C.C.

BIOLOGY

91) NCERT Pg. # 4

92) NCERT-XI, Pg # 4

93)

NCERT XI Page No. # 22

94) NCERT-XI, Pg # 8

95) NCERT-XI, Pg.# 4, 5

96)

NCERT XI Pg. # 8

97) NCERT XI Pg.# 11

98) NCERT (XI) Pg. # 90, 91

99) NCERT (XI) Pg. # 91

100) NCERT XI pg.# 91

101)

NCERT XI Page No. # 21

102) NCERT-XIth Pg # 14, Fig. 2.3

103) NCERT-XI, Pg. # 14

104)

NCERT-XI Pg#13

105) NCERT XI Pg.# 14

106) NCERT XI ; Page No. # 13 (2.1.1)

107)

NCERT (XI) ; Page. # 12,13

108) NCERT Pg. # 17, 18

109) 5 members are of monera
(*Rhizobium, Frankia, Nostoc, PPLO, Anabaena*)

110) NCERT Pg. # 13

111)

Module Page No. # 29, 32

112)

NCERT-XI, Pg. # 13, 14

113) NCERT XI Page No. # 11, 13

114) NCERT XI, Pg. # 90, 91

115)

NCERT XI, Page No. # 4,5

116)

NCERT-XI, Pg. # 20, 21

Peptidoglycan wall, Nitrogen fixation ability, multicellular, heterocyst, tissue.

117)

NCERT XI Page No. # 14

118) NCERT, Pg. # 15

119)

NCERT XI Page # 15

120)

NCERT XI Page No. # 14

121)

NCERT XIth Pg.# 15

122)

NCERT XI Page No. # 15

123) NCERT-XI, Pg. # 12,16

124) NCERT (XI) Pg # 16

125) All mushrooms, including edible ones like Agaricus, belong to the Kingdom Fungi.

126)

NCERT Pg # 17

127)

NCERT Pg # 17

128)

NCERT (XI) Pg. # 18

129) NCERT XI Page No. # 17, 18

130)

NCERT Pg # 18

131) NCERT-XI Pg. # 18

132) NCERT (XI) (E & H) Pg. # 17, 18

133) NCERT (XI) Pg # 20, 21

134)

NCERT-XI, Pg. # 21

135)

NCERT XI Page No. # 21

136) Pg. No. 51 NCERT 2022 - 2023 Edition

137) NCERT (XI) Pg# 56 Para: 4.2.11.2

138)

NCERT (XI) Pg. # 50

139)

NCERT (XI) Pg. # 49

140) **Explaining the Question:**
Which of the following is exclusively marine.

Concept: Marine

Solution:

A. Sea walnut - Ctenuchids - Exclusively Marine
B. Ascidia - Urochordate - Marine
C. Amphioxus - Cephalocarids - Marine

Final Answer:
Option (4) All above

141) New NCERT - XI, Pg. # 47
(A) Mouth is located ventrally:
   ● **True.** Chondrichthyes, like sharks and rays, have their mouths positioned on the underside of their bodies (ventrally).
(B) Notochord is absent throughout the life:
   ● **False.** Chondrichthyes do possess a notochord, which is a flexible rod-shaped structure that provides support. While it is replaced by cartilage in most vertebrates, it remains present in Chondrichthyes.
(C) Gill slits are absent:

● **False.** Chondrichthyes are characterized by the presence of gill slits, which are openings on the sides of their head used for respiration.

(D) Cycloid scale is absent:

● **True.** Cycloid scales are a type of fish scale found in bony fishes (Osteichthyes) and not in Chondrichthyes. Chondrichthyes have placoid scales, which are small, tooth-like structures. Therefore, out of the four statements, only **two are correct for Chondrichthyes:** (A) Mouth is located ventrally and (D) Cycloid scale is absent.

So, the answer to the question "How many of the above statements are correct for Chondrichthyes?" is

Option 3: Two

142) NCERT Pg. # 50

143) NCERT Pg. # 42

144)

NCERT Pg. # 46

145) NCERT Pg. # 42

146)

New NCERT - XI, Pg. # 49

147)

NCERT Pg. # 48,49,50

148)

The correct answer is Option 2.
- **Genus Name:** Frog
- **Two Characters:**

A. **(a) A tympanum represents ear:** Frogs have a tympanum, which is an external eardrum.
B. **(b) Fertilization is external:** Most frogs exhibit external fertilization, where the female releases eggs into the water, and the male fertilizes them externally.

- **Class/Phylum: Amphibia:** Frogs belong to the class Amphibia.

149) NCERT XIth Pg.#46, Last Para

150)

Pg. No. 47, 48 NCERT 2022 - 2023 Edition

151) Pg. No. 46, 47 NCERT 2022 - 2023 Edition

152)

NCERT-XI, Pg#57

153) NCERT (XI) Pg# 54 Para 4.2.10

154) The correct answer is **2. Leech, Tapeworm, Earthworm.**
• **Monoecious** organisms have both male and female reproductive organs in the same individual. This means they can produce both sperm and eggs.

155) Salamanders, being amphibians just like newts, also typically have 10 pairs of cranial nerves. Therefore, the number of cranial nerves in a salamander is 10 pairs OR 20 IN NUMBER .

156) NCERT–XI, Pg. # 54

157) NCERT–XI, Pg. # 44

158) NCERT–XI, Pg. # 58

159) NCERT Pg.#41 Figure-4.6

160) **Explanation:**

Phylum Aschelminthes (Nematoda) exhibits a pseudocoelom, meaning:

A. The mesoderm does not completely line the body cavity instead scattered in forn of pouches.

Correct Answer: Option (3) Pseudocoelom

161) XI NCERT Pg. No :- 50, 54

162) NCERT Pg. # 45

163) NCERT Pg. # 45

164) NCERT Pg. # 43, 45

165) NCERT-XII, Pg # 42

166) NCERT, Pg # 49

167) NCERT, Pg # 49

168) NCERT, Pg # 49

169) NCERT, Pg # 45

170) NCERT Pg. # 40

171) NCERT Pg. # 44

172) NCERT, Pg # 46-48

173) NCERT Pg. # 41, 42

174) NCERT Pg. # 57

175) NCERT-XII Pg. # 57

176)

Pg. No. 55 NCERT 2022 - 2023 Edition

177) NCERT Pg. # 47

178) NCERT Pg. # 38

179)

Module-5 Page No. # 50

180) NCERT XI Page No. 38