PHYSICS

1) ln(1000) = ? (Approximately)

(1) 3
(2) 5
(3) 7
(4) 9

2)

The value of – tan (–30°) is :-

(1) $\frac{-1}{\sqrt{3}}$
(2) $\frac{1}{\sqrt{3}}$
(3) $\sqrt{3}$
(4) 1

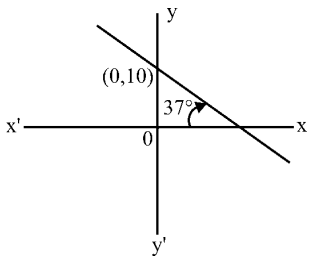
3)

If tan θ = $\frac{-1}{\sqrt{3}}$ then value of θ are :-

(1) 30°, 150°
(2) 60°, 120°
(3) 150°, 210°
(4) 150°, 330°

4) $\frac{\tan(90-\theta).\sec(180-\theta).\sin(-\theta)}{\sin(180-\theta).\cot(360+\theta).\operatorname{cosec}(90+\theta)}$ = ... ?

(1) 1
(2) –1
(3) 0
(4) ∞



5) For given graph of straight line. Which statement is correct :-

(1) Slope angle is 143°
(2) Intercept on y-axis is 10
(3) Slope is negative
(4) All above

6)

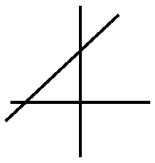
When x changes from 0 to $\frac{\pi}{2}$ then the area bounded by the curve y = sinx and the x-axis will be :-

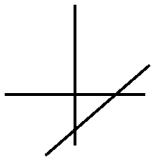
(1) 0
(2) 1
(3) 2
(4) $\frac{\pi}{2}$

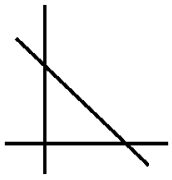
7) The equation $\sqrt{x}$ = 2y, represents that graph between x and y is a :-

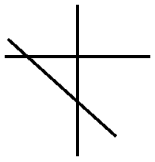
(1) Straight line
(2) Parabola
(3) Hyperbola
(4) Circle

8) Graph of 2x + 3y – 6 = 0 is :

(1) 

(2) 

(3) 

(4) 

9) If $x = at^3$ and $y = bt^2$, then $\frac{dy}{dx}$ = ...

(1) $\frac{b}{a}$

(2) $\frac{2b}{3at}$

(3) $\frac{3b}{at}$

(4) $\frac{bt^2}{at^3}$

10) The minimum value of $y = 5x^2 - 2x + 1$ is :-

(1) $\frac{1}{5}$

(2) $\frac{2}{5}$

(3) $\frac{4}{5}$

(4) $\frac{3}{5}$

11) What is the minimum value of $\frac{2}{4 + \sin\theta + \sqrt{3}\cos\theta}$

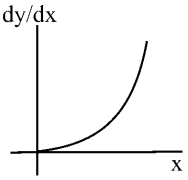
(1) 0

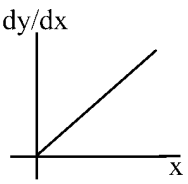
(2) 1

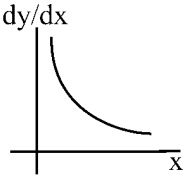
(3) $\frac{1}{3}$

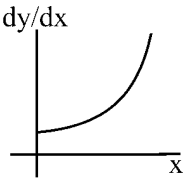
(4) $\frac{1}{2}$

12) If $y = 4x^2$, then graph between $\frac{dy}{dx}$ and x is:-

(1)


(2)


(3)


(4) 

13) $(0.996)^{1/4}$ = ... :-

(1) 0.992
(2) 1.002
(3) 0.999
(4) 1.001

14) A particle move along the curve $12y = x^3$. Which coordinate changes at faster rate at x = 10 :

(1) X - coordinate
(2) Y - coordinate
(3) Both X and Y - coordinate
(4) Data insufficient

15) $\frac{d}{dx}\sqrt{2x^2+1}$ =

(1) $2x(2x^2 + 1)^{½}$
(2) $2x(2x^2 + 1)^{-½}$
(3) $(2x^2 +1)^{½}$
(4) $(2x^2 + 1)^{-½}$

16) If $y = \frac{x^2}{(x^3+2)}$, then $\frac{dy}{dx}$ = ?

(1) $\frac{4x-x^4}{(x^3+2)^2}$
(2) $\frac{2x^4+4x-3x^2}{(x^3+2)^2}$
(3) $\frac{(x^3+2)2-x^2}{(x^3+2)^2}$
(4) None of these

17) The value of $\int_0^1 9x^8\,dx + \int_0^{\pi/2} \cos x\,dx$ is :-

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

(4) 2

18) Value of $\int_0^{\frac{\pi}{2\omega}} 5\sin\omega t\,dt$ is :-

(1) 10 ω

(2) 5/ω

(3) $\frac{10\pi}{\omega}$

(4) 5ω

19) A particle travels from point A(2, 7, 5)m to point B(8, 7, 7)m, then displacement of particle is

(1) $\sqrt{10}$m along x-axis

(2) $2\sqrt{10}$m along x-axis

(3) $2\sqrt{10}$m at $\theta = \cos^{-1}\left(\frac{3}{\sqrt{10}}\right)$ with x-axis

(4) $2\sqrt{10}$m, at $\theta = \cos^{-1}\left(\frac{1}{\sqrt{10}}\right)$ with x-axis

20) If a particle is moving on a circular track of radius 7m then find the distance travelled when it completed three-fourth of the circle :-

(1) 33m

(2) 22m

(3) 11m

(4) 44m

21) A particle starts from the origin goes along the x-axis to the point (50, 0) m and then returns along the same line to the point (–50, 0) m. Find the distance and displacement of the particle during the trip :-

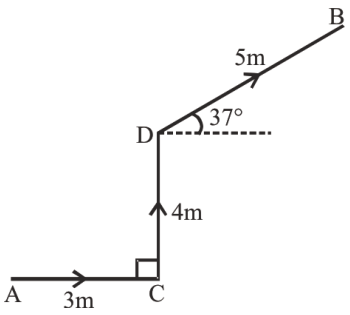
(1) 150m, -50m

(2) 50m, -150m

(3) 150m, -30m

(4) 150m, -50m

22) A particle moves from A to B as shown in figure. The displacement of the particle is :-



(1) 7 m

(2) 5 m

(3) $7\sqrt{2}$ m

(4) 10 m

23) A particle is moving with speed 6 m/s along the direction of $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$, then its velocity is :

(1) $(4\hat{i} + 2\hat{j} - 4\hat{k})$ m/s

(2) $(4\hat{i} + 4\hat{j} - 2\hat{k})$ m/s

(3) $(4\hat{i} + 4\hat{j} - 4\hat{k})$ m/s

(4) $(2\hat{i} + 4\hat{j} - 2\hat{k})$ m/s

24) $\vec{A} = 0.3\hat{i} + b\hat{j} - 0.4\hat{k}$ is an unit vector. What is the value of b ?

(1) 0.25

(2) 0.75

(3) $\sqrt{0.75}$

(4) 0.93

25) Which of the following cannot be the vector addition of two force vectors, if the forces are 10N and 15N ?

(1) 4 N

(2) 5 N

(3) 5.5 N

(4) 24.5 N

26) **Statement 1 :** Any two vectors $\vec{A}$ and $\vec{B}$, representing any two physical quantities, may be added using the triangle law.
Statement 2 : Vectors, by definition, obey the triangle law of addition.

(1) Statement–1 is True, Statement–2 is True ; Statement–2 is a correct explanation for Statement–1.

(2) Statement–1 is True, Statement–2 is True ; Statement–2 is not a correct explanation for Statement–1.

(3) Statement–1 is True, Statement–2 is False.

(4) Statement–1 is False, Statement–2 is True.

27) The unit vector parallel to the resultant of the vectors $\vec{A} = 4\hat{i} + 3\hat{j} + 6\hat{k}$ and $\vec{B} = -\hat{i} + 3\hat{j} - 8\hat{k}$ is:

(1) $\frac{1}{7}(3\hat{i} + 6\hat{j} - 2\hat{k})$

(2) $\frac{1}{7}(3\hat{i} + 6\hat{j} + 2\hat{k})$

(3) $\frac{1}{49}(3\hat{i} + 6\hat{j} - 2\hat{k})$

(4) $\frac{1}{49}(3\hat{i} - 6\hat{j} + 2\hat{k})$

28) The scalar product of two vectors is $2\sqrt{3}$ and the magnitude of their vector product is 2. The angle between them is :

(1) 30°

(2) 45°

(3) 60°

(4) 90°

29) The resultant of the vector $\vec{A}$ & $\vec{B}$ is perpendicular to the vector $\vec{A}$ & magnitude of $\vec{A}$ is half the magnitude of vector $\vec{B}$. The angle between $\vec{A}$ & $\vec{B}$ is :-

(1) 120°

(2) 150°

(3) 135°

(4) 60°

30)

If $\left|\vec{P}\right| = \left|2\vec{Q}\right|$, then angle between $\left(\vec{P} + 2\vec{Q}\right)$ and $\left(\vec{P} - 2\vec{Q}\right)$ is :-

(1) 180°

(2) 90°

(3) 45°

(4) 36°

31) If $\vec{A}$, $\vec{B}$ and $\vec{C}$ are vectors having a unit magnitude and $\vec{A} + \vec{B} + \vec{C} = \vec{0}$, then $\vec{A}.\vec{B} + \vec{B}.\vec{C} + \vec{C}.\vec{A}$ will be :-

(1) 1

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

(3) $-\frac{1}{2}$

(4) zero

32) If $\vec{A} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{B} = \hat{i} + 2\hat{j} + 2\hat{k}$, find the magnitude of component of $(\vec{A} + \vec{B})$ along $\vec{B}$:

(1) 4 unit

(2) 5 unit

(3) 6 unit

(4) 7 unit

33) Two vectors $\vec{a}$ and $\vec{b}$ have magnitudes of 3 units and 4 units, respectively. Angle between $\vec{a}$ and $\vec{b}$ is θ.

List-I		List-II	
(I)	$\vec{a} \cdot \vec{b} = 0$	(P)	$\theta = 0$
(II)	$\hat{a} \cdot \vec{b} = 4$ units	(Q)	$\theta = \pi$
(III)	$\vec{a} \cdot \vec{b} = -12$ units	(R)	$\theta = \frac{\pi}{4}$
(IV)	$\lvert\vec{a} + \vec{b}\rvert = 5$ units	(S)	$\theta = \frac{\pi}{2}$

(1) (I) - (S), (II) - (P), (III) - (Q), (IV) - (R)

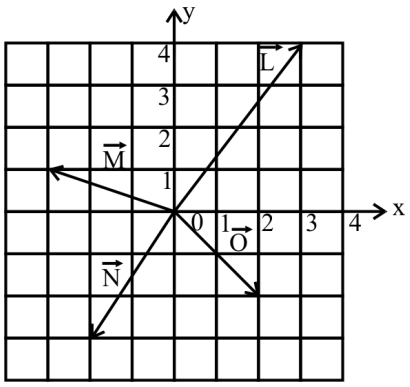
(2) (I) - (S), (II) - (P), (III) - (Q), (IV) - (S)

(3) (I) - (R), (II) - (Q), (III) - (P), (IV) - (S)

(4) (I) - (Q), (II) - (S), (III) - (R), (IV) - (P)

34)

Four vectors are as shown in the graph.



List-I		List-II	
(P)	$\vec{L} + \vec{N} - \vec{M}$	(1)	$\vec{0}$
(Q)	$\vec{M} + \vec{O}$	(2)	$4\hat{i} + \hat{j}$
(R)	$\vec{O} - \vec{N}$	(3)	$-\hat{i} - \hat{j}$
(S)	$\vec{L} + \vec{M} + \vec{N} + \vec{O}$	(4)	$4\hat{i}$

(1) P → 2; Q → 3; R → 4; S → 1

(2) P → 4; Q → 3; R → 2; S → 1

(3) P → 4; Q → 3; R → 1; S → 3

(4) P → 1; Q → 4; R → 3; S → 2

35) A vector is represented by $3\hat{i}+\hat{j}+2\hat{k}$. Its length in x-y plane is :-

(1) 2
(2) $\sqrt{14}$
(3) $\sqrt{10}$
(4) $\sqrt{5}$

36) Angle between vector $2\hat{i}+3\hat{j}+\hat{k}$ and $2\hat{i}-\hat{j}-\hat{k}$ is :

(1) π/2
(2) π/3
(3) π/4
(4) 0

37) A force $\vec{F}=6\hat{i}-8\hat{j}+10\hat{k}$ newton produces an acceleration of 5 m/sec^2 in a body. The mass of body would be :-

(1) $10\sqrt{2}$kg
(2) $5\sqrt{2}$kg
(3) $2\sqrt{2}$kg
(4) None of these

38) A vector makes 60° angle with x-axis and 30° with y-axis, then find the angle between the vector and z-axis :

(1) $\cos^{-1}\left(\frac{1}{2}\right)$
(2) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$
(3) 90°
(4) 0°

39) If $\vec{A}=2\hat{i}+4\hat{j}-5\hat{k}$, the direction cosines of the vector $\vec{A}$ are :-

(1) $\frac{2}{\sqrt{45}}, \frac{4}{\sqrt{45}}$ and $\frac{-5}{\sqrt{45}}$
(2) $\frac{1}{\sqrt{45}}, \frac{2}{\sqrt{45}}$ and $\frac{3}{\sqrt{45}}$
(3) $\frac{4}{\sqrt{45}}$, 0 and $\frac{4}{\sqrt{45}}$
(4) $\frac{3}{\sqrt{45}}, \frac{2}{\sqrt{45}}$ and $\frac{5}{\sqrt{45}}$

40) Find a unit vector which is making equal angles with all x, y & z axes :-

(1) $\frac{\hat{i}+\hat{j}+\hat{k}}{3}$

(2) $\frac{\left(\hat{i}+2\hat{j}+\hat{k}\right)}{\sqrt{3}}$

(3) $\frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$

(4) None of these

41) Vector sum of two forces of 10N and 6N cannot be :-

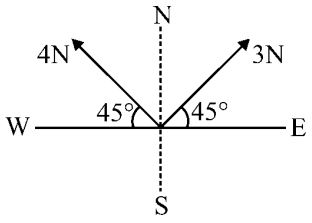
(1) 4 N

(2) 8 N

(3) 12 N

(4) 2 N

42) Find out the magnitude of resultant vector of 4N and 3N force :-



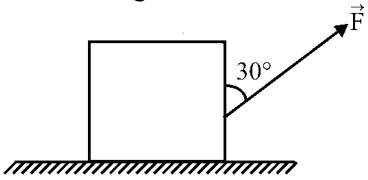
(1) 7 N

(2) 6 N

(3) 5 N

(4) 10 N

43) A force of 100 N is acting on a block as shown in figure. Its horizontal and vertical components are respectively :-



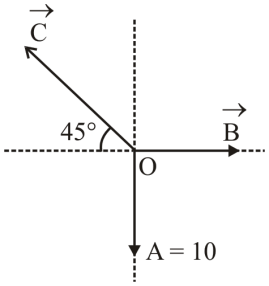
(1) 50 N, $50\sqrt{3}$N

(2) $50\sqrt{3}$N, 50N

(3) 50N, $\frac{50}{\sqrt{3}}$N

(4) $\frac{50}{\sqrt{3}}$ N, 50N

44) If the resultant of vectors $\vec{A}, \vec{B}$ and $\vec{C}$ shown in figure is zero, then magnitudes of $\vec{B}$ and $\vec{C}$ are



respectively :-

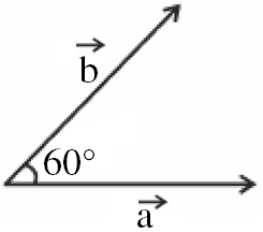
(1) $\frac{10,10}{\sqrt{2}}$

(2) 5,10

(3) $10\sqrt{2},5$

(4) 10,10

45) If resultant of two vectors $\vec{a}$ and $\vec{b}$ shown in the figure is $\sqrt{7}b$, then value of $\frac{b}{a}$ is :-



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

(2) 1

(3) 2

(4) 3

CHEMISTRY

1) Match list-I with list-II and select the correct answer using the codes given below :

List-I (element)		**List-II (electronic configuration)**	
(a)	Gallium	(i)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$
(b)	Vanadium	(ii)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$
(c)	Zinc	(iii)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^1$
(d)	Scandium	(iv)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$

Codes :

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

(4)	ii	i	iii	iv

(1) 1

(2) 2

(3) 3

(4) 4

2) Match list-I (atomic number of elements) with list-II (position of elements in periodic table) and select the correct answer using the codes given below :

List-I		**List-II**	
(a)	19	(i)	p-block
(b)	22	(ii)	f-block
(c)	32	(iii)	d-block
(d)	64	(iv)	s-block

Codes :

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

(1) 1

(2) 2

(3) 3

(4) 4

3) If an atom has electronic configuration
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$, it will be placed in :

(1) Second group

(2) Third group

(3) Fifth group

(4) Sixth group

4) The elements having the electronic configuration
[Kr] $4d^{10}$, $4f^{14}$, $5s^2$, $5p^6$, $5d^2$, $6s^2$

(1) s-block

(2) p-block

(3) d-block

(4) f-block

5) Correct order of Ionization Energy is:

(1) $K^+ > Cu^+ > K > Cu$

(2) $Cu^+ > Zn^+ > Zn > Cu$

(3) Pd > Pt

(4) Sc > Y > La

6) Correct order of ionization energy is :

(1) Fe > Co > Ni (IP_1)

(2) Cr > Mn (IP_2)

(3) Mn > Fe (IP_3)

(4) All are correct

7) General electronic configuration of Lanthanoids is -

(1) $(n-1)d^{1-10}\ (n+1)s^2, (n-2)f^{1-14}\ n = 5$

(2) $(n-1)d^{1-10}\ (n+1)f^{1-14}, (n+1)s^2\ n = 5$

(3) $nf^{1-14}, (n+1)d^{0,1}, (n+2)s^2\ n = 6$

(4) $nf^{1-14}, (n+1)d^{0,1}, (n+2)s^2\ n = 4$

8) Total no. of d electron in an element having Z = 78 :

(1) 19

(2) 28

(3) 9

(4) 29

9) The correct order for 3rd ionisation energy is ?

(1) C > N > O > F

(2) O > N > F > C

(3) O > F > N > C

(4) F > O > C > N

10) Choose the incorrect statement :

(1) P > S > Cl > Ar (VWR)

(2) Na > Br > Cl > F (Atomic Radius)

(3) The I.E. order : $Cu^+ < Zn^+$

(4) Minimum IP, IP_2 & IP_3in 3d series – $_{21}Sc$

11) Successive ionisation energies of an element 'X' are given below (in K. cal):

IE1	IE2	IE3	IE4
165	195	756	995

Electronic configuration of the element 'X' is :

(1) $1s^2, 2s^22p^6, 3s^23p^3$

(2) $1s^2, 2s^1$

(3) $1s^2, 2s^2 2p^2$

(4) $1s^2, 2s^2 2p^6, 3s^2$

12) In which case the energy Absorbed is maximum:

(1) $Ne \rightarrow Ne^+$

(2) $He \rightarrow He^+$

(3) $Na \rightarrow Na^+$

(4) $Mg \rightarrow Mg^+$

13) Which of the following element belongs to VIII group ?

(1) Z = 26

(2) Z = 45

(3) Z = 78

(4) All of the above

14) Which of the following ion has highest radius

(1) Sc^{+3}

(2) La^{+3}

(3) Ce^{+3}

(4) Lu^{+3}

15) Incorrect order of IP is :

(1) Tl < Al

(2) Cu < Zn

(3) $Cu^+ > Zn^+$

(4) Pd > Ag

16) Which of the following order of ionisation energy is/are correct :
(a) Y > La (b) Sb > Te
(c) $K^+ < Cu^+$ (d) $Cr^+ > Mn^+$
Correct answer is :

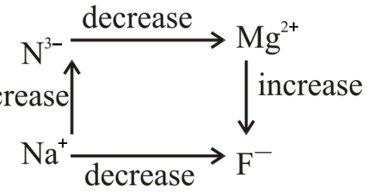
(1) b and c only

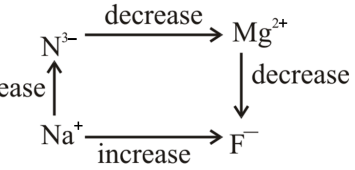
(2) a and d only

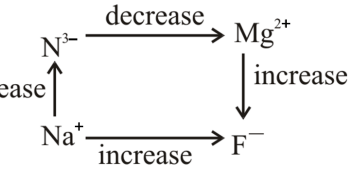
(3) a , b & d only

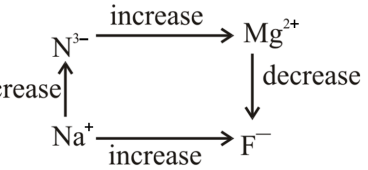
(4) None of above

17) Which diagram correctly represent variation of size of isoelectronic ions :-

(1) 

(2) 

(3) 

(4) 

18) At the time of filling of e^- Which is the correct order of increasing energy of the listed orbitals in the atom of titanium ?
(At. no. Z = 22)

(1) 3s 3p 3d 4s
(2) 3s 3p 4s 3d
(3) 3s 4s 3p 3d
(4) 4s 3s 3p 3d

19) If P.T. is of Eleven periods then total number of elements present in it are :-

(1) 168
(2) 118
(3) 290
(4) 362

20) If Z_{eff} of Li is "X" then Z_{eff} for Ca according to Slater rule will be :-

(1) X
(2) X + 0.9
(3) X + 1.85
(4) X + 1.55

21) Which of the following is not correctly matched :

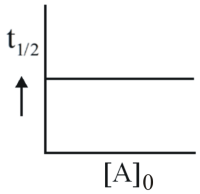
(1) [Xe] $4f^{14}5d^{10}6s^2$ – Transition element
(2) [Xe] $5f^{7}6d^{1}7s^2$ – Inner transition element
(3) [Xe] $4f^{14}5d^{10}6s^{2}6p^{6}7s^2$ – Normal element

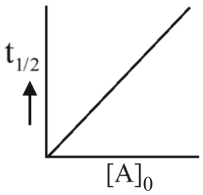
(4) None

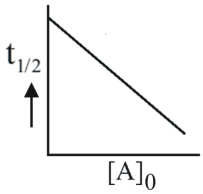
22) If total 110 elements are present in periodic table than how many of them contain e^- in f subshell :-

(1) 28
(2) 57
(3) 58
(4) 53

23) Which of the following graph represents zero order reaction ?

(1) 

(2) 

(3) 

(4) None of the above

24) Which of the following expressions correctly describes the relationship between the rates at which NO_2 and Cl_2 are consumed in the reaction below ? $2NO_2(g) + Cl_2(g) \rightarrow 2NO_2Cl(g)$

(1) $\frac{-\Delta[NO_2]}{\Delta t} = -\frac{1}{2}\frac{\Delta[Cl_2]}{\Delta t}$
(2) $\frac{-\Delta[NO_2]}{\Delta t} = 2\frac{\Delta[Cl_2]}{\Delta t}$
(3) $\frac{-\Delta[NO_2]}{\Delta t} = \frac{1}{2}\frac{\Delta[Cl_2]}{\Delta t}$
(4) $\frac{-\Delta[NO_2]}{\Delta t} = -2\frac{\Delta[Cl_2]}{\Delta t}$

25) 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} $molL^{-1}$ sec^{-1}. The rate of reaction & rate of disappearance of H_2 will be (In $molL^{-1}$ 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}

26) 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) $r = k[A] [B]$

27) At high Pressure H_2 gas is adsorbed on metal surface like tungsten. This follows which order :

(1) 3^{rd}

(2) 2^{nd}

(3) Zero

(4) 1^{st}

28) The reaction A(g) + 2B(g) → C(g) + D(g) is an elementary process. In an experiment, the initial partial pressure of A & B are $P_A = 0.6$ and $P_B = 0.8$ atm. Calculate the ratio of rate of reaction relative to initial rate when P_C becomes 0.2 atm.

(1) $\frac{1}{4}$

(2) $\frac{1}{10}$

(3) $\frac{1}{6}$

(4) 2

29) In the following reaction, rate constant is
1.2×10^{-2} M s^{-1} A → B. What is concentration of B after 10 min., if we start with 10 M of A.

(1) 0.12 M

(2) 7.2 M

(3) 8.2 M

(4) 2.7 M

30) The initial rate of reaction A + 5B + 6C → 3L + 3M has been determined by measuring the rate of disppearance of A under the following conditions:

Experiment No.	$[A]_0$ (M)	$[B]_0$ (M)	$[C]_0$ (M)	Initial rate (M min^{-1})
1	0.02	0.02	0.02	2.08×10^{-3}
2	0.01	0.02	0.02	1.04×10^{-3}
3	0.02	0.04	0.02	4.16×10^{-3}
4	0.02	0.02	0.04	8.32×10^{-3}

Determine the rate law :-

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

(2) Rate = k [A] $[C]^2$

(3) Rate = k [A] [B] [C]

(4) Rate = k [A] [B] $[C]^{1/2}$

31) A reaction $2NO + 2H_2 \rightarrow N_2 + 2H_2O$
has following mechanism
Step-I : $2NO \rightleftharpoons N_2O_2$ (fast)
Step-II : $N_2O_2 + H_2 \rightarrow N_2O + H_2O$ (slow)
Step-III : $N_2O + H_2 \rightarrow N_2 + H_2O$ (fast)
Which of the following substance is a reaction intermediate

(1) H_2

(2) NO

(3) H_2O

(4) N_2O_2

32) The reaction
$2AB(g) + 2C(g) \rightarrow A_2(g) + 2BC(g)$
Proceeds according to the mechanism
$2AB \rightleftharpoons A_2B_2$ (fast)
$A_2B_2 + C \rightarrow A_2B + BC$ (slow)
$A_2B + C \rightarrow A_2 + BC$ (fast)
Rate law of the reaction is :-

(1) $r = k[AB]^2[C]$

(2) $r = k[AB][C]^2$

(3) $r = k[AB]^2[C][A_2]$

(4) $r = k[A_2B_2][C]$

33) A first order reaction undergoes 90% completion in 90 minutes then it undergoes 99.9% completion in–

(1) 99 min

(2) 99.9 min

(3) 180 min

(4) 270 min

34) $A(g) \rightarrow 2B(g) + C(g)$
for a first order reaction –
(P_o = Initial pressure ; P_t = Total pressure at time t)

(1) $K = \frac{2.303}{t} \log \frac{P_o}{P_t}$

(2) $K = \frac{2.303}{t} \log \frac{P_o}{(P_o - P_t)}$

(3) $K = \frac{2.303}{t} \log \frac{P_o}{(3P_o - P_t)}$

(4) $K = \frac{2.303}{t} \log \frac{2P_o}{(3P_o - P_t)}$

35) The decomposition of ammonia on tungsten surface at 500 K follows zero order kinetics. The half-life period of this reaction is 45 minutes when the initial pressure is 4 bar. The half-life period (minutes) of the reaction when the initial pressure is 16 bar at the same temperature is

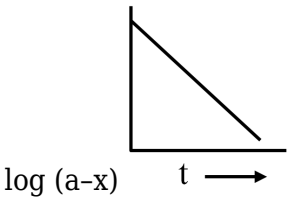
(1) 120
(2) 60
(3) 240
(4) 180

36) For a reaction A → B if the slope of a line of the graph between concentration of formed product and time (in hour) for zero order reaction is 0.2 then what will be the initial concentration of reactant in mol L^{-1}, if after 30 minute its concentration is 0.05 mol L^{-1} :-

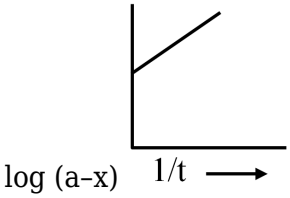
(1) 0.01
(2) 0.15
(3) 0.25
(4) 0.50

37) Which of the following curves represents a Ist order reaction :

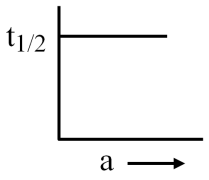
(1)



(2)



(3)



(4) Both (1) and (3)

38) **Statement-I :-** Decomposition of gaseous ammonia on a hot platinum surface is a zero order reaction at high pressure.
Statement-II :- At high pressure, the metal surface gets saturated with gas molecules.

(1) Both Statement-I and Statement-II are false
(2) Statement-I is true but Statement-II is false
(3) Statement-I is false but Statement-II is true
(4) Both Statement-I and Statement-II are true

39) Mathematical representation for $t_{1/4}$ life i.e. when $1/4^{th}$ first order reaction is completed is given by

(1) $t_{1/4} = \frac{2.303}{K} \log 4$
(2) $t_{1/4} = \frac{2.303}{K} \log 3$
(3) $t_{1/4} = \frac{2.303}{K} \log \frac{4}{3}$
(4) $t_{1/4} = \frac{2.303}{K} \log \frac{3}{4}$

40) For a first-order reaction A → Product, the half-life is 100 seconds. The rate constant of the reaction is :

(1) $6.9 \times 10^{-2}\ s^{-1}$
(2) $6.93 \times 10^{-4}\ s^{-1}$
(3) $6.93 \times 10^{-3}\ s^{-1}$
(4) $6.93 \times 10^{-1}\ s^{-1}$

41) A first order reaction is 75% completed in 100 min. How long will it take for it's 87.5% completion?

(1) 125 min
(2) 150 min
(3) 175 min
(4) 200 min

42) A first order reaction has a rate constant of $2.303 \times 10^{-3}\ s^{-1}$. The time required for 40g of this reactant to reduce to 10 g will be-
[Given that $\log_{10} 2 = 0.3010$]

(1) 230.3 s
(2) 301 s
(3) 2000 s
(4) 602 s

43) The half life of a first order reaction is 2000 years. If the concentration after 8000 years is 0.02 M, then the initial concentration was :

(1) 0.16 M
(2) 0.32 M
(3) 0.08 M
(4) 0.04 M

44) Which is not an example of first order reaction -

(1) Adsorption of gas on metal surface at high pressure.
(2) Radioactive decay.
(3) Hydrolysis of ester in acidic medium
(4) Inversion of cane sugar.

45) The rate of first order reaction is 0.04 mol L^{-1} s^{-1} at 10 seconds and 0.03 mol L^{-1} s^{-1} at 20 seconds after initiation of the reaction. The half life period of the reaction is :-

(1) 44.1 sec
(2) 54.1 sec
(3) 24.1 sec
(4) 34.1 sec

BIOLOGY

1) Which statement is not correct ?

(1) The menstrual flow results due to breakdown of endometrial lining
(2) The secretion of LH and FSH decreases gradually during the follicular phase
(3) During pregnancy all events of menstrual cycle are paused
(4) In the absence of fertilisation, the corpus luteum starts degenerating

2) During pregnancy menstrual cycle does not occur due to :-

(1) Negative feed back of LH
(2) Positive feed back of FSH
(3) Negative feed back of progesterone and estrogen
(4) Positive feed back of FSH, LH

3) The semen is composed of sperms and the secretions of various male accessory glands. Choose the unpaired male accessory gland from the given options.

(1) Seminal vesicle
(2) Prostate gland
(3) Bulbourethral gland

(4) Penis

4)

Identify the correct match from the columns I, II and III.

Column-I		**Column-II**		**Column-III**	
(A)	Proliferative phase	(a)	14^{th} day	(i)	Formation of corpus luteum
(B)	Secretory phase	(b)	1^{st}-4^{th} day	(ii)	Development of Graafian follicle
(C)	Bleeding phase	(c)	15^{th}-28^{th} day	(iii)	Shedding of Endometrium
(D)	Ovulatory phase	(d)	5^{th}-13^{th} day	(iv)	Release of secondary oocyte

(1) A → d → iii; B → c → i, C → b → iv, D → a → ii

(2) A → c → ii; B → b → iii, C → a → i, D → d → iv

(3) A → d → ii; B → c → i, C → b → iii, D → a → iv

(4) A → d → iii; B → b → iv, C → a → ii, D → c → i

5) Formation of second polar body occurs :-

(1) In ovary after completion of meiosis-I

(2) In oviduct after completion of meiosis-I

(3) In ovary after completion of meiosis-II

(4) In oviduct after completion of meiosis-II

6) A female of 38 years is suffering from endometrial cancer, doctor advise her hysterectomy. If she goes through surgery then which of the following changes still seen in her ?

(1) Ovarian changes

(2) Uterine changes

(3) Menstrual cycle

(4) Fertilization

7) What is true about menstruation in human ?

(1) It stops during pregnancy

(2) it only occurs if the egg is not fertilized

(3) Menstrual phase is followed by follicular phase

(4) All of these

8) **Assertion :** The cyclical changes in the ovary and the uterus during menstrual cycle are induced by changes in the levels of pituitary and ovarian hormones.

Reason : During ovulation generally only two ovum is released per menstrual cycle.

(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.

9) Which layer undergoes cyclic changes during menstrual cycle?

(1) Perimetrium
(2) Tunica albuginea
(3) Endometrium
(4) Tunica Propria

10) In the given options, which of following hormone is secreted in large amount by corpus luteum?

(1) LH
(2) Estrogen
(3) Progesterone
(4) FSH

11) Ploidy of cells that line seminiferous tubules on its inside is :

(1) 'n' only
(2) '2n' only
(3) Both 'n' and '2n'
(4) Neither 'n' nor '2n'

12) In humans at the end of first meiotic division the male germ cell differentiates into–

(1) Primary spermatocyte
(2) Secondary spermatocyte
(3) Spermatids
(4) Spermatogonia

13) **Statement-1 :** At puberty only 1,60,000-8,00,000 primary follicles are left in each ovary in human female.
Statement-2 : Secondary spermatocytes has 23 chromosomes in male human.

(1) Both statement 1 and statement 2 are incorrect.
(2) Statement 1 is correct but statement 2 is incorrect.
(3) Statement 1 is incorrect but statement 2 is correct.
(4) Both statement 1 and statement 2 are correct.

14) The _____ are the first haploid cells during the process of spermatogenesis.

(1) Spermatogonia

(2) Primary spermatocyte

(3) Secondary spermatocyte

(4) Spermatid

15) Penis is made up of special tissue that helps in ..... of penis to facilitate .....

(1) Erection, Ejaculation

(2) Ejaculation, insemination

(3) Erection, insemination

(4) Ejaculation, erection

16) ***Assertion :*** In male, urethra is considered as urinogenital duct.
Reason : Urethra carries both urine and semen in males.

(1) Both assertion and reason are true and reason is the correct explanation of assertion.

(2) Both assertion and reason are true and reason is not the correct explanation of assertion.

(3) Assertion is true but reason is false.

(4) Both assertion and reason are false

17)

Match the column-A with column-B : -

	Column-A		**Column-B**
(A)	Transfer of sperms into the female genital tract	(i)	Ejaculation
(B)	Sperms released from the seminiferous tubules	(ii)	Semination
(C)	Forceful expulsion of semen from body of male	(iii)	Spermiation
(D)	Liberation of sperms from testis	(iv)	Insemination

(1) A-iv, B-iii, C-ii, D-i

(2) A-ii, B-iii, C-i, D-iv

(3) A-iv, B-iii, C-i, D-ii

(4) A-iii, B-iv, C-ii, D-i

18) Which statement is correct :-

(1) Glans penis is covered by a loose fold of skin called foreskin

(2) The male accessory glands include paired seminal vesicle, paired prostate and unpaired bulbourethral gland

(3) Both (1) and (2)

(4) Breast are secondary sex organ

19) Which one of the following is incorrect match?

(1) Myometrium : Exhibits strong contraction during delivery of the baby.

(2) Endometrium : Undergoes cyclical changes during menstrual cycle.

(3) Perimetrium : Outer layer of uterus

(4) Uterus : Fertilization canal.

20) Read the given sentences carefully.
(a) 'A' is single
(b) The shape of 'A' is like an inverted pear
(c) 'A' opens into vagina
(d) The wall of the 'A' has three layers of tissue
Here 'A' is :-

(1) Ovary
(2) Uterus
(3) Urethra
(4) Fallopian tube

21) Which one of the following is not a function of sertoli cell ?

(1) Phagocytosis of dead sperm cells
(2) It helps in lubrication of penis
(3) It produces inhibin hormone
(4) It stimulates secretion of some factors which help in process of spermiogeneis

22) Select the correct sequence from the following :-

(1) Gametogenesis → Fertilization → Zygote → Parturition
(2) Gametogenesis → Fertilization → Embryogenesis → Zygote
(3) Zygote → Embryogenesis → Fertilization → Gametogenesis
(4) Embryogenesis → Zygote → Fertilization → Gametogenesis

23) **Assertion :-** The Testis are situated inside abdominal cavity within a pouch called scrotum.
Reason :- Scrotum help in maintaining high temperature of testis necessary for spermatogenesis.

(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.

24) How many of the following structures are present only in male ? Vas deferens, Seminiferous tubule, breast, Anus, Urethra, Epididymis, Bartholin gland, Clitoris

(1) Five
(2) Three
(3) Seven
(4) Four

25) The male sex accessory ducts include :-

(1) Penis, Testis and ureter

(2) Rete testis, vasa efferentia, epididymis and vas deferens

(3) Ureter, urinary bladder and urethra

(4) Ureter, urethra and penis

26) Given below are two statements :
Statement I : Vas deferens receives a duct from urinary bladder and opens into urethra as the ejaculatory duct.
Statement II : The cavity of the cervix is called cervical canal which along with vulva forms birth canal.
In the light of the above statements, choose the correct answer from the options given below :

(1) Both statement I and statement II are false

(2) Statement I is correct but statement II is false

(3) Statement I incorrect but statement II is true

(4) Both statement I and statement II are true

27) Read the following statements and choose the correct regarding female reproductive cycle ?
(A) Oestrous cycle runs in non primate female mammals
(B) Menopause is the initiation of first menstrual cycle occurs at puberty
(C) Absence of menstrual cycle may be considered as the sign of pregnancy
(D) In female primates menstruation repeats cyclically between menarche and menopause
Choose the most appropriate answer from the options given below :

(1) A and B only

(2) A, B and C only

(3) A, C and D only

(4) A and D only

28) **Statement-I :** The labia minora are fleshy folds outside the labia majora.
Statement-II : A functional mammary gland and menstrual cycle present in all female mammals.
In the light of above statements find correct answer -

(1) Both statement I and II are correct

(2) Statement I correct but II is incorrect

(3) Both statements are false

(4) Statement I incorrect but II is correct

29) Read the following structures -
Clitoris, Mammary gland, Oviduct, Labia minora, Vagina, Uterine fundus, Ovary.
How many of above given structures are paired in human female ?

(1) Four

(2) Three

(3) Two

(4) One

30)

Match List-I with List-II :

	List-I		**List-II**
(A)	Spermatogenesis	(I)	Oxytocin
(B)	Corpus luteum	(II)	Implantation
(C)	Zona pellucida	(III)	Before birth
(D)	Blastocyst	(IV)	Progesteron
(E)	Parturition	(V)	Puberty
(F)	Oogenesis	(VI)	Acellular

Choose the option with all correct matches :

(1) A-V, B-IV, C-II, D-VI, E-III, F-I

(2) A-V, B-IV, C-VI, D-II, E-III, F-I

(3) A-V, B-IV, C-VI, D-II, E-I, F-III

(4) A-IV, B-V, C-II, D-VI, E-III, F-I

31) Which of following statement about sperm and spermatogenesis is not incorrect ?

(1) Sperm is haploid but spermatid is diploid

(2) Spermatogenesis starts at embryonic stage

(3) One primary spermatocyte give rise to 4 unequal sperms

(4) Sec. spermatocyte is formed as a result of first meiotic division

32) **Assertion (A) :** Spermatogenesis starts at the age of puberty.
Reason (R) : There is significant rise in the level of GnRH Gonadotropic releasing hormone at birth.

(1) Both A and R are true, but R is not correct explanation of A

(2) A is true but R is false

(3) Both A and R are true and R is correct explanation of A

(4) Both A and R are false

33) During which of following process, semen is released by the penis into vagina, so that fertilization can be done?

(1) Fertilization

(2) Gestation

(3) Insemination

(4) Spermiation

34) Read all statements given below and select the incorrect statement -

(1) At puberty, 60,000 to 80000 primary follicle are left in each women

(2) Oocyte is present within follicle in ovary

(3) Primary follicle transforms into sec follicle

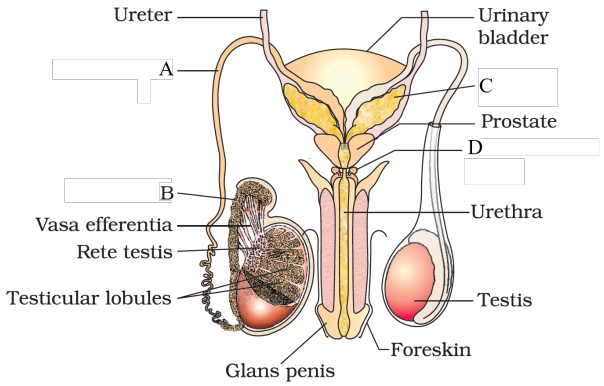
(4) Tertiary follicle is characterised by fluid filled cavity antrum

35) **Statement-I :** Thin epithelium encloses the stroma part of ovary.
Statement-II : Stroma is divided into a peripheral medulla and inner cortex.

(1) Statement I and II both false
(2) Statement I and II both true
(3) Statement I is true but II is false
(4) Statement I is false but II is true

36) **Assertion :** Humans are sexually reproducing and viviparous.
Reason : In human, fertilization leads to zygote formation, which grow to embryo and ultimately new young one delivers out.

(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**.



37) Which of the following is correct for A, B, C and D :
Option :

	A	**B**	**C**	**D**
(1)	Carries sperm	Stores sperm permanently	Secretes a fluid that lubricates ureter	Secretes a fluid that ultimately becomes semen
(2)	Carries Sertoli cells	Stores sperm	Carries urine	Stores sperm
(3)	Carries sperm	Storessperm	Secretes a fluid that ultimately becomes semen	Secretes a fluid that lubricates distal urethra

(4)	Carries sperm	Stores sperm Temporarily	Secretes a fluid that lubricates distal urethra	Secretes a fluid that ultimately becomes semen

(1) 1

(2) 2

(3) 3

(4) 4

38) Sertoli cells are found in __A__.
Select the correct option for A

(1) Between seminiferous tubule

(2) Interstitial space

(3) Between spermatogonia

(4) Testis

39) Menarche occurs at :

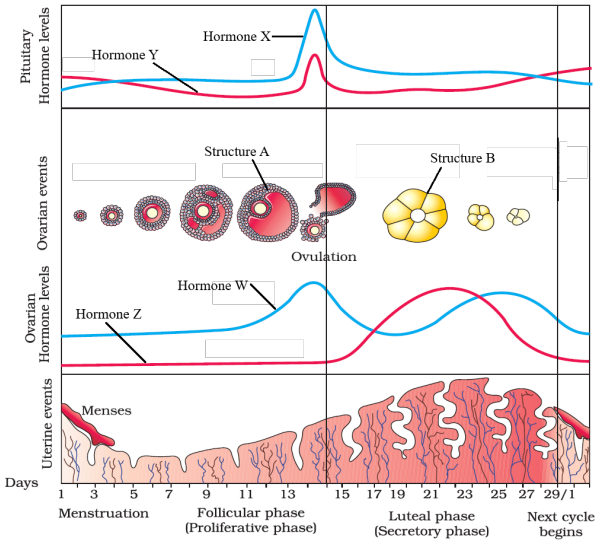
(1) Age of 50 year

(2) Embryonic stage

(3) Puberty

(4) Birth

40) Identify the hormones (W, X, Y, Z) and the structures (A, B) labelled in the diagram :



Opt.	Hormone X	Hormone Y	Structure A	Structure B	Hormone W	Hormone Z
(1)	FSH	LH	Mature follicle	Corpus luteum	Estrogen	Proge-sterone

(2)	LH	FSH	Mature follicle	Corpus luteum	Proge-sterone	Estrogen
(3)	FSH	LH	Mature follicle	Regressing corpus luteum	Proge-sterone	Estrogen
(4)	LH	FSH	Mature follicle	Corpus luteum	Estrogen	Proge-sterone

(1) 1

(2) 2

(3) 3

(4) 4

41) "Darwin of 20th century" proposed :-

(1) Static concept of species

(2) Biological concept of species

(3) Phylogenetic concept of classification

(4) Numerical concept of classification

42) In which of the following system of classification each character (vegetative and sexual) is given equal importance ?
(a) Artificial system
(b) Numerical system
(c) Natural system
(d) Phylogenetic system

(1) a and d

(2) only b

(3) a, b and c

(4) a and b

43) In Binomial system when name of any plant is hand written then it should be :-

(1) Italicized

(2) Underlined cummulatively

(3) Underlined separately

(4) Closed in bracket

44) Biodiversity refers to :-

(1) Only number of organisms present on earth

(2) Only types of organisms present on earth

(3) Number and types of organisms present on earth

(4) Number and types of dead organisms present in rivers

45) Which taxon is not related to wheat :-

(1) Sapindales

(2) Poaceae

(3) Monocotyledonae

(4) *Triticum*

46) The relation of Solanaceae and Convolvulaceae with Polymoniales is similar to the relation occuring in :-

(1) Felidae and Canidae with Carnivora

(2) Primata and Carnivora with Mammalia

(3) Amphibia and Reptilia with Chordata

(4) *Solanum* and *Petunia* with Solanaceae

47) **Assertion** :- Genera are aggregates of closely related species. **Reason** :- Genus comprises a group of related species which has more common characters in comparison to species of other genera.

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

(2) Assertion is True but the Reason is False.

(3) Assertion is False but the Reason is True.

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

48) 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

49) Match the following :-

	Column-I		**Column-II**
(A)	Biological name	(i)	Poaceae
(B)	Genus	(ii)	*Triticum aestivum*
(C)	Family	(iii)	Poales

(D)	Order	(iv)	*Triticum*

(1) A-i, B-ii, C-iii, D-iv

(2) A-iii, B-iv, C-i, D-ii

(3) A-ii, B-iv, C-i, D-iii

(4) A-iv, B-i, C-iii, D-ii

50) According to the rules of binomial system of nomenclature which of the following is not correct ?

(1) First word in biological name represents the genus while the second component denotes the specific epithet

(2) Specific epithet starts with capital letter while the genus starts with a small letter

(3) Both the words in a biological name, when handwritten, are seperately underlined

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

51) **Assertion :** Members of a species are reproductively isolated from others belonging to other species.
Reason : Species is the basic taxonomic category.

(1) If both statements A and R are true and statement R is a correct explanation of statement A

(2) If both statements A and R are true but statement R is not a correct explanation of statement A

(3) If statement A is true but statement R is false

(4) If both statements A and R are false statements

52) Find the incorrect statement from the followings -

(1) Aristotle was the earliest to attempt a more scientific basis for classification.

(2) Fungi have chitin in their cell wall while green plants have cellulose.

(3) Dinoflagellate float passively in water while diatoms have two flagella for the same.

(4) Majority of plant virus contain ss RNA

53) Which group show most extensive metabolic diversity :-

(1) Bacteria

(2) Bryophytes

(3) Algae

(4) Protista

54) Choose the **incorrect** statement regarding Mycoplasma :-

(1) They lack cell wall

(2) They are smallest living cells

(3) They can survive without oxygen

(4) They have mesosome for respiration

55) Lichens are best indicators of :-

(1) Water pollution

(2) Soil pollution

(3) Air pollution

(4) Radio active pollution

56) Similar type of chlorophyll pigments are present in :-

(1) Euglenoid and blue green algae

(2) Euglenoid and diatoms

(3) Diatoms and dinoflagellates

(4) Euglenoid and dinoflagellata

57) How many of the following do have cell wall around their cell ?
Spirulina, Chlorella, Amoeba, Euglena, spore of slime mould, PPLO, potato, *Paramecium, Albugo*

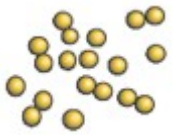
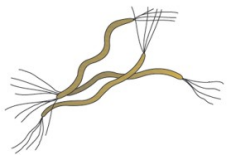
(1) Six

(2) Five

(3) Seven

(4) Eight

58) Match the given below figure

	Column-I		**Column-II**
1.		a.	Vibria
2.		b.	Spirilla
3.		c.	Cocci
4.		d.	Bacilli

(1) 1-a, 2-b, 3-d, 4-c

(2) 1-a, 2-b, 3-c, 4-d

(3) 1-d, 2-c, 3-b, 4-a

(4) 1-c, 2-d, 3-b, 4-a

59) Which of the following is/are common features of ascomycetes class ?
(I) Ascocarp

(II) Aseptate mycelium
(III) Conidiophores
(IV) Commonly found in aquatic habitats

(1) I and III
(2) II, III and IV
(3) I, II and III
(4) II and III

60) Which set of diseases are caused by bacteria ?

(1) Cholera, Typhoid, Tetanus, Citrus canker
(2) Cholera, AIDS, Tetanus, Kuru
(3) Typhoid, Tetanus, Influenza, Rabies
(4) Rabies, AIDS, Mumps, Kuru

61) In 1969 R.H. Whittaker proposed five kingdom system of classification. On which basis he classified organisms into the kingdoms i.e. monera, protista, fungi, plantae and Animalia ?

(1) Cell structure & body organiszation
(2) Body organization & the mode of nutrition
(3) Life style (reproduction) and phylogenetic relationship
(4) All the above

62) The major ecological role of kingdom viz. plantae, fungi and animalia, respectively :-

(1) Decomposer, Producer & Consumer
(2) Producer, Decomposer & Consumer
(3) Consumer, Producer & Decomposer
(4) Producer, Consumer & Decomposer

63) The monerian live in some of the most harsh habitates such as extreme salty areas, hot springs and marshy areas and differ from eubacteria in having different cell and wall cell membrane structure is/are :-

(1) *Mycoplasma*
(2) Cyanobacteria
(3) Archaebacteria
(4) Actinomycetes

64) According to R.H. Whittaker, *Chlamydomonas* & *Chlorella* are placed is Kingdom :-

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

65) The cell wall of fungi is composed of :-

(1) Chitin and sucrose
(2) Cellulose and polysaccharides
(3) Chitin and polysaccharides
(4) Chitin, polysaccharides and glycogen

66) Select the wrong pair :-

(1) *Gonyaulax* – Dinoflagellate
(2) Archeabacteria – Cellulosic cell wall
(3) Slime moulds – Saprophytic protist
(4) *Mycoplasma* – Cell wall less & can survive without oxygen.

67) Match the column-I with column-II and choose the correct option :-

	Column-I		**Column-II**
A	Deuteromycetes	(i)	Gametes are similar in morphology
B	Ascomycetes	(ii)	Sexual spores are produced endogenously
C	Basidiomycetes	(iii)	Imperfect fungi
D	Phycomycetes	(iv)	Sex organ are absent

(1) A-iii, B-iv, C-i, D-ii
(2) A-iv, B-i, C-iii, D-ii
(3) A-iv, B-iii, C-i, D-ii
(4) A-iii, B-ii, C-iv, D-i

68) Which one of the following is a correct statement:-

(1) Linnaeus proposed a five kingdom classification
(2) Halophiles are present in the gut of several ruminant animals
(3) All single celled prokaryotes are placed under protista
(4) Mycoplasma can survive without oxygen

69) Which statement is/are wrong with respect to kingdom protista ?
(i) Almost all single celled eukaryotes are placed under protista
(ii) The boundaries of this kingdom are not well defined.
(iii) Chrysophytes, dinoflagellated, Euglenoids, slimemoulds and protozoans are included under protista.
(iv) All protista are eukaryotic, achlorophyllous, heterotrophic, nonvascular organism.

(1) Only (ii)
(2) Only (iii)
(3) Only (iv)
(4) None of these

70) Read the following four statements (A-D) and answer as asked next to them.
(A) Almost all single celled eukaryotes are placed under protista
(B) Most of the organism of chrysophytes are photosynthetic.
(C) Dinoflagellates appear yellow, green brown, blue or red depend on the main pigments present in their cells.
(D) Chlorophyll pigment absent in Euglena
How many of the above statement are correct ?

(1) Two
(2) Three
(3) Four
(4) one

71) Read the following statement (A-D).
(A) Cell wall of Fungi consists of chitin.
(B) Most fungi are heterotrophic
(C) Fungi can also live as symbionts in association with algae as lichens and with roots of higher plants as mycorrhiza
(D) Fusion of two nuclei is called plasmogamy
How many of the above statement are correct ?

(1) Two
(2) Three
(3) Four
(4) One

72) According to five kingdom classification multicellular eukaryotes are placed in kingdoms ?

(1) Protista, fungi & Monera
(2) Monera, Plantae & Animalia
(3) Animalia & plantae only
(4) Plantae, fungi & Animalia

73) **Statement I :** Bacteria reproduce mainly by spore formation.
Statement II : Chemosynthetic bacteria play a great role in recycling nutrients like nitrogen, phosphorous, iron and sulphur.

(1) Statement I is correct but statement II is incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Both statement I and statement II are correct.
(4) Both statement I and statement II are incorrect.

74) **Assertion (A) :** Archaebacteria are found in some of the most harsh habitats.
Reason (R) : Archaebacteria consist of complex cell wall.

(1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(2) (A) is correct but (R) is not correct

(3) (A) is incorrect but (R) is correct

(4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

75) **Assertion :** Most fungi are saprophytes.
Reason : Most fungi are heterotrophic and absorb soluble organic matter from dead substrates.

(1) **Assertion** is correct but **Reason** is incorrect

(2) **Assertion** is incorrect but **Reason** is correct

(3) **Assertion** and **Reason** both are correct and **Reason** is correct explanation of **Assertion**

(4) **Assertion** and **Reason** both are correct but **Reason** is not correct explanation of **Assertion**

76) **Statement I :** In ascomycetes and basidiomycetes, an intervening dikaryophase occurs.
Statement II : Dikaryotic mycelium ultimately give rise to basidium, in basidiomycetes.

(1) Both the **Statement** are correct.

(2) Both the **Statement** are incorrect.

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

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

77)

Most fungi are _____and absorb soluble organic matter from dead substrates and hence are called _____.
Those that depend on living plants and animals are called _____. Identify A, B and C ?

(1) A-Heterotrophic, B-Saprophytes, C-Parasites

(2) A-Autotrophic, B-Parasites, C-Saprophytes,

(3) A-Autotrophic, B-Saprophytes, C-Symbionts

(4) A-Symbionts, B-Heterotroph, C-Parasite

78) Which statement is correct ?

(1) The network of mycelium is called hypha.

(2) The cell walls of fungi are composed of chitin and polysaccharide.

(3) Conidia produced endogenously on the special mycelium called conidiophores.

(4) The deuteromycetes reproduce only by sexual spores known as conidia.

79)

Match column I with column II and select correct one ?

Column-I		**Column-II**	
(A)	*Rhizopus*	(i)	Phycomycetes
(B)	*Claviceps*	(ii)	Ascomycetes
(C)	*Ustilago*	(iii)	Basidiomycetes

(D)	*Trichoderma*	(iv)	Deuteromycetes

(1) A-(i), B-(ii), C-(iii), D-(iv)

(2) A-(iv), B-(iii), C-(ii), D-(i)

(3) A-(i), B-(iv), C-(iii), D-(ii)

(4) A-(iii), B-(i), C-(iv), D-(ii)

80) How many organisms are included in Monera in given list ?
(A) Slime moulds (B) Dinoflagellates
(C) Protozoans (D) Pseudomonas
(E) Archebacteria (F) Basidiomycetes

(1) 2

(2) 4

(3) 3

(4) 5

81)

Choose the incorrect match from following :-

(1) Mycoplasma - Tri-layered cell wall

(2) Gonyaulax - Causes red tide and water 'bloom'

(3) Albugo - Parasite on mustard

(4) Spirulina - Photosynthetic

82) Consider the following statement (A-D) :-
(A) Dinoflagellates also called armoured algae due to presence plated cell wall.
(B) Diatoms have two flagella one is transverse and other is longitudinal.
(C) Spores of slime moulds do not possess cell wall.
(D) Euglenoids show both autotophic and heterotophic nutrition.
How many of the above statements is/are NOT correct ?

(1) Two

(2) Three

(3) Four

(4) One

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

(1) Euglenoids

(2) Chrysophytes

(3) Slime moulds

(4) Dinoflagellates

84) The transfer of genetic material from one bacterium to other bacterium by virus, is called:-

(1) Conjugation
(2) Transduction
(3) Transformation
(4) Crossing over

85) How many of the following statements are correct ?
(A) Protists reproduce asexually and sexually and may have flagella or cilia.
(B) Slime moulds are saprophytic protists.
(C) The cell wall of dinoflagellates has stiff silicated plates on outer surface.
(D) Chrysophytes float passively with water currents
(E) The pigments of euglenoids are identical to those present in higher plants.

(1) Five
(2) Four
(3) Three
(4) Two

86) Which of the following is not one of the basis for the division of kingdom fungi into various classes ?

(1) Morphology of mycelium
(2) Mode of spore formation
(3) Complexity of cell
(4) Fruiting bodies

87) How many of the following fungi have septate and Branched Mycelium with absence of Asexual spores
Neurospora, Alternaria, Claviceps, Agaricus, Colletotrichum, Penicillium, Trichoderma, Aspergillus, Mucor, Rhizopus and Albugo

(1) 8
(2) 3
(3) 1
(4) All

88) Identify the correct match from column-I and II :-

Column-I	**Column-II**
(i) *Euglena*	(a) Saprophytic
(ii) Diatom	(b) Diatomaceous earth
(iii) Slime mould	(c) Red tide
(iv) Dinoflagellates	(d) Gonyaulax
	(e) Pellicle

	(f) Chief Producer of oceans

(1) (i)-e, (ii)-b,f (iii)-c, (iv)-a,d

(2) (i)-e, (ii)-b,f (iii)-a, (iv)-c,d

(3) (i)-e, (ii)-b,c,f (iii)-a, (iv)-d

(4) (i)-e, (ii)-b,c,f (iii)-d, (iv)-a

89)

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

(1) *Alternaria*

(2) *Aspergillus*

(3) *Neurospora*

(4) *Claviceps*

90) **Assertion :** The spores of slime mould possess true walls.
Reason : They are extremely resistant and survive for many years.

(1) Assertion is true, Reason is incorrect.

(2) Assertion is incorrect, Reason is correct.

(3) Assertion and Reason both are true but reason is not correct explanation of Assertion

(4) Assertion and Reason both are true but reason is correct explanation of Assertion

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.	3	2	4	1	4	2	2	3	2	3	3	2	3	2	2	1	4	2	3	1
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	1	3	2	3	1	4	1	1	1	2	2	2	2	2	3	1	3	3	1	3
Q.	41	42	43	44	45															
A.	4	3	1	1	1															

CHEMISTRY

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

BIOLOGY

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

SOLUTIONS

PHYSICS

1) $\ln(1000) = \ln(10)^3$
$\Rightarrow 3\ln(10) = 3(2.3)$
$\Rightarrow 6.9 \simeq 7$ Ans.

2)

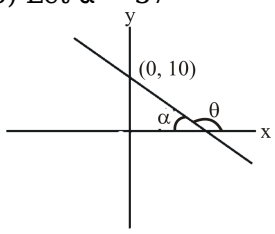
–tan(–30º)
= –[–tan30º]
= tan30º = $\frac{1}{\sqrt{3}}$

3)

tan θ = $-\frac{1}{\sqrt{3}}$
⇒ tan θ = tan 150° **OR** tan 330°
⇒ θ = 150° **OR** 330°

4) $\frac{\cot\theta \cdot (-\sec\theta) \cdot (-\sin\theta)}{\sin\theta \cdot (\cot\theta) \cdot (+\sec\theta)} = 1$

5) Let α = 37º



Slope angle ⇒ θ = 180º – α
θ = 180º – 37º
θ = 143º
Intercept on y-axis = 10
Slope = tan θ = tan 143º
= tan (180º – 37º)
slope = – tan 37º
slope = $\frac{-3}{4}$

6)

Area = $\int_0^{\pi/2} \sin x dx$

$= [-\cos x]_0^{\pi/2}$

$= -\left[\cos\frac{\pi}{2} - \cos 0\right]$

= -[0 – 1] = 1

7) $\sqrt{x} = 2y$

$x = 4y^2$

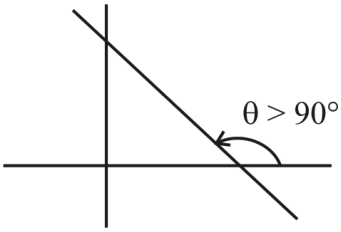
$x \propto y^2 \rightarrow$ Parabola graph

8) 2x + y – 6 = 0

3y = – 2x + 6 → compare y = mx + c

m = $-\frac{2}{3} = -ive \rightarrow \theta > 90^\circ$

c = +



9) $\frac{dy}{dx} = \frac{(dy/dt)}{(dx/dt)} = \frac{2bt}{3at^2} = \frac{2b}{3at}$

10)

$y = 5x^2 - 2x + 1$

$\frac{dy}{dx} = 10x - 2$

$\left(x = \frac{1}{5}\right)$

$\therefore y_{min} = \frac{5 \times 1}{25} - \frac{2}{5} + 1 = \frac{4}{5}$

11)

Let $y = \frac{2}{4 + \sin\theta + \sqrt{3}\cos\theta}$

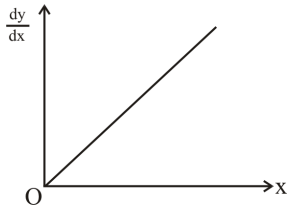
Let $x = 4 + \sin\theta + \sqrt{3}\cos\theta$

y will be minimum when x will be maximum and

$x = 4 + \sin\theta + \sqrt{3}\cos\theta$

$x_{max} = 4 + 2 = 6$

$$y = \frac{2}{6} = \frac{1}{3}$$

12) 

$$\frac{dy}{dx} = 8x$$

$$\frac{dy}{dx} \propto x$$

13)

$y = (.996)^{1/4} = (1 - .004)^{1/4}$
$= 1 - .001 = .999$

14) $12y = x^3$
differentiate w.r.t. 't'

$$12\frac{dy}{dt} = 3x^2\frac{dx}{dt}$$

$$\frac{dy}{dt} = \frac{1}{4}x^2\left(\frac{dx}{dt}\right)$$

at x = 10

$$\frac{dy}{dt} = 25\left(\frac{dx}{dt}\right)$$

15) $$\frac{d}{dx}\sqrt{2x^2+1} = \frac{1(4x)}{2\sqrt{2x^2+1}} = 2x\left(2x^2+1\right)^{-1/2}$$

16) $$y = \frac{x^2}{(x^3+2)}\frac{dy}{dx} = \frac{(x^3+2)(2x)-(3x^2)(x^2)}{(x^3+2)^2} = \frac{4x-x^4}{(x^3+2)^2}$$

17) $$y = \int_0^1 9x^8\,dx + \int_0^{\pi/2}\cos x\,dx$$
$$= \left[x^9\right]_0^1 + [\sin x]_0^{\pi/2}$$
$$= (1-0) + \left[\sin\frac{\pi}{2} - \sin 0\right] = 2$$

18) $$\int_0^{\frac{\pi}{2\omega}} 5\sin\omega t\,dt = \frac{-5}{\omega}[\cos\omega t]_0^{\frac{p}{2\omega}}$$

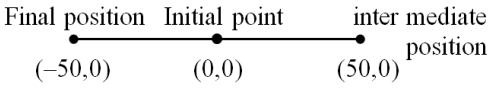
$$\Rightarrow = \frac{-5}{\omega}\left[\cos\frac{\pi}{2} - \cos 0\right] = \frac{5}{\omega}$$

19)

$S = \sqrt{6^2 + 0^2 + 2^2}$
$S = 2\sqrt{10}m$
$\cos\alpha = \frac{6}{2\sqrt{10}} = \frac{3}{\sqrt{10}}$

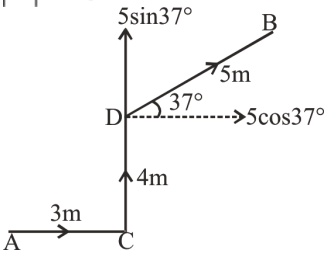
20) Distance = $\frac{3}{4}(2\pi R) = \frac{3}{4}\left(2 \times \frac{22}{7} \times 7\right) = 33$ m

21)



distance O → 50 → 0 → 50
50 + 50 + 50 = 150 m
displacement → – 50 m.

22) $\vec{S}_x = 3\hat{i} + 5\cos 37\hat{i} = 7\hat{i}$
$\vec{S}_y = 4\hat{j} + 5\sin 37^\circ\hat{j} = 7\hat{j}$
$\vec{S} = \vec{S}_x + \vec{S}_y = 7\hat{i} + 7\hat{j}$
$\left|\vec{S}\right| = \sqrt{(7)^2 + (7)^2} = 7\sqrt{2}m$



23) $\vec{v} = |\vec{v}|\,\hat{v}$
$= 6\left(\frac{2\hat{i} + 2\hat{j} - \hat{k}}{3}\right)$
$= 4\hat{i} + 4\hat{j} - 2\hat{k}$ m/s

24) $\sqrt{(0.3)^2 + b^2 + (0.4)^2} = 1$
$0.09 + b^2 + 0.16 = 1$
$b = \sqrt{0.75}$

25)

A = 10 N, B = 15 N
R_{max} = 10 + 15 = 25 N
R_{min} = 15 – 10 = 5 N
5N ≤ R ≤ 25 N

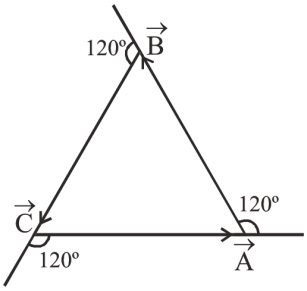
26) Only vector of same nature can be added

27) $\vec{R} = 3\hat{i} + 6\hat{j} - 2\hat{k}$
$\hat{R} = \frac{1}{7}(3\hat{i} + 6\hat{j} - 2\hat{k})$

28) $\tan\theta = \frac{|\vec{A} \times \vec{B}|}{\vec{A}.\vec{B}} = \frac{2}{2\sqrt{3}} = \frac{1}{\sqrt{3}}$
θ = 30°

29) $\vec{A} + \vec{B} = \vec{R}$
$\cos\theta = \frac{-A}{B}$
$\cos\theta = \frac{-B}{2B} = \frac{-1}{2} \quad \left[\because A = \frac{B}{2}\right]$
cosθ = cos(180° – 60°)
θ = 120°

30) $\cos\theta = \frac{\left(\vec{P} + 2\vec{Q}\right) \cdot \left(\vec{P} - 2\vec{Q}\right)}{\sqrt{P^2 + 4Q^2}\sqrt{P^2 + 4Q^2}}$
$\cos\theta = \frac{P^2 - P \cdot 2Q + P \cdot 2Q - 4Q^2}{\sqrt{P^2 + 4Q^2}\sqrt{P^2 + 4Q^2}}$
cosθ = 0, θ = 90°

31)


$\vec{A}.\vec{B} + \vec{B}.\vec{C} + \vec{C}.\vec{A}$
= AB cos 120° + BC cos 120° + AC cos 120° as A = B = C = 1
$\vec{A}.\vec{B} + \vec{B}.\vec{C} + \vec{C}.\vec{A}$ = 3 cos 120° = –3/2

32) $\vec{A} + \vec{B} = 2\hat{i} + \hat{j} + \hat{k} + \hat{i} + 2\hat{j} + 2\hat{k}$
$= 3\hat{i} + 3\hat{j} + 3\hat{k}$

$\hat{B} = \frac{\hat{i} + 2\hat{j} + 2\hat{k}}{\sqrt{1+4+4}} = \frac{1}{3}\left[\hat{i} + 2\hat{j} + 2\hat{k}\right]$

magn. of component of $\left(\vec{A} + \vec{B}\right)$

along $\vec{B} = \left(\vec{A} + \vec{B}\right).\hat{B}$

$= \frac{1}{3}[3 + 6 + 6] = 5$ units

33)

(P) $\vec{a} \cdot \vec{b} = ab\cos\theta = 0$

$\therefore \theta = \frac{\pi}{2}$

(Q) $\hat{a} \cdot \vec{b} = b\cos\theta = 4$

$\Rightarrow 4\cos\theta = 4$

$\therefore \theta = 0$

(R) $\vec{a} \cdot \vec{b} = -12 = 3 \times 4\cos\theta$

$\therefore \theta = \pi$

(S) $\left|\vec{a} + \vec{b}\right| = 5 = \sqrt{3^2 + 4^2}$

$\therefore \theta = \frac{\pi}{2}$

34) $\vec{L} = 3\hat{i} + 4\hat{j}$

$\vec{M} = -3\hat{i} + \hat{j}$

$\vec{N} = -2\hat{i} - 3\hat{j}$

$\vec{O} = 2\hat{i} - 2\hat{j}$

35)

Length in x-y plane = $\sqrt{3^2 + 1^2} = \sqrt{10}$

36) $\cos\theta = \frac{\vec{A} \cdot \vec{B}}{AB} = \frac{(2\hat{i} + 3\hat{j} + k) \cdot (2\hat{i} - \hat{j} - \hat{k})}{\sqrt{4+9+1}\sqrt{4+1+1}}$

$\cos\theta = \frac{4 - 3 - 1}{\sqrt{14}\sqrt{6}} = 0$

$\theta = \frac{\pi}{2}$

37)

$F = 10\sqrt{2}\,N$

$a = 5\ m/s^2$

$m = \frac{F}{a} = 2\sqrt{2}\,kg$

38) $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$
$\alpha = 60°$, $\beta = 30°$
$\cos\gamma = 0$
$\gamma = 90°$

39) $\cos\alpha = \frac{2}{\sqrt{45}}$, $\cos\beta = \frac{4}{\sqrt{45}}$; $\cos\gamma = \frac{-5}{\sqrt{45}}$

40)

$\alpha = \beta = \gamma$
$\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$
$\cos\alpha = \cos\beta = \cos\gamma = \frac{1}{\sqrt{3}}$
Unit vector = $1\cos\alpha\,\hat{i} + 1\cos\beta\,\hat{j} + 1\cos\gamma\,\hat{k} = \frac{1}{\sqrt{3}}$
$= \frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$

41) If, $R^2 = 10^2 + 6^2 + 2 \times 10 \times 6\cos\theta$
then, $(10 - 6) \leq R \leq 10 + 6$
so R cannot be 2N.

42) $F_1 = 3$, $F_2 = 4$, $\theta = 90°$
$R = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos\theta}$
$R = \sqrt{F_1^2 + F_2^2} = 5$ N

43) $F_{Hz} = 100\sin30° = 50$N
$F_{vertical} = 100\cos30° = 50\sqrt{3}$N

44)

OC sin 45° = OA
OC $\left(\frac{1}{\sqrt{2}}\right) = 10$
OC = $10\sqrt{2}$
OB = OC cos 45° = 10

45) $\frac{1}{2}$

46)

	(a)	(b)	(c)	(d)
(3)	iii	iv	ii	i

47)

	(a)	**(b)**	**(c)**	**(d)**
(2)	iv	iii	i	ii

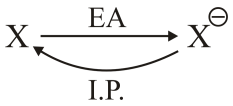
48)

Fifth group

49)

d-block

50)



{IP of x^- = EA of x}

51)

Sc < Ti > V < Zn
or Sc < V < Ti < Zn

52)

ns(n–2)f (n–1)d np

53)

Pt = Z = 78 ($3d^{10}$,$4d^{10}$, $5d^9$ = 29)

54)

F > O > C > N

55)

The I.E. order : $Cu^{+} < Zn^{+}$

56)

$1s^2$, $2s^2 2p^6$, $3s^2$

57)

Question Explanation:-

The question asks in which case the maximum energy is released

Concept:- Electron affinity trend.

Solution:

A. Elements in Group 17 (like Cl) generally have the highest electron affinities, as they are one electron away from achieving a stable noble gas configuration.

B. $Cl \rightarrow Cl^{-}$: Chlorine has a high electron affinity, so a significant amount of energy is released when chlorine gains an electron.

Final Answer:- Option (1):

58)

All of the above

59)

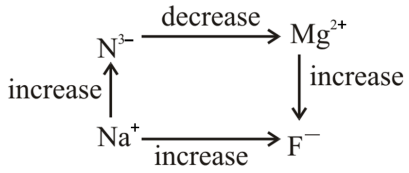
La^{+3}

60)

Tl < Al

61)

a and d only

62) 

63)

3s 3p 4s 3d

64)

362

65)

X + 1.55

66)

[Xe] $4f^{14}5d^{10}6s^{2}$ – Transition element

67)

53

68) **Asking about :** Graph identification

Concept : $\boxed{t_{1/2} = \frac{[A_0]}{2K}}$

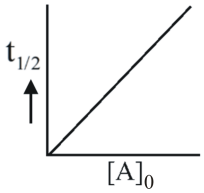
Solution/Explanation/Calculation:

We know, for zero order reaction -

$A_t = A_0 - Kt$

$\boxed{t_{1/2} = \frac{[A_0]}{2K}}$

$t_{1/2} \propto [A_0]$



Hence, the correct answer is option (2)

69) $R.O.R = -\frac{1}{2}\frac{\Delta[NO_2]}{\Delta t} = -\frac{\Delta[Cl_2]}{\Delta t} = +\frac{1}{2}\frac{\Delta[NO_2]}{\Delta t}$

$\Rightarrow -\frac{\Delta[NO_2]}{\Delta t} = -\frac{2\Delta[Cl_2]}{\Delta t}$

70) According to stoichiometry of reaction :

$\frac{[\text{rate of disappearance of } N_2]}{1} = \frac{(\text{rate of disappearance of } H_2)}{3} = \frac{(\text{rate of appearance of } NH_3)}{2}$

= rate of reaction

$\Rightarrow$ rate of reaction

$= \frac{2.5 \times 10^{-4}}{2} 2 = 1.25 \times 10^{-4} \frac{mol}{\ell - sec}$

$\Rightarrow \frac{\text{rate of disappearance of } H_2}{3}$

$= 1.25 \times 10^{-4} \frac{mol}{\ell - sec}$

$\Rightarrow$ rate of disappearance

$= 3.75 \times 10^{-4} \frac{mole}{\ell - sec}$

71)

NCERT Pg.No.99

72)

Zero

73) A + 2B → C + D

initally 0.6 0.8

At time t 0.6 – x 0.8 – 2x x x

given x = 0.2

At time t $P_A = 0.6 - 0.2 = 0.4$

$P_B = 0.8 - 0.4 = 0.4$

$r_{initial} = k[P_A] [P_B]^2$

$r_t = k[P_A] [P_B]_t^2$

$$\frac{r_t}{r_{initial}} = \frac{k[0.4][0.4]^2}{k[0.6][0.8]^2} = \frac{0.4 \times 0.4 \times 0.4}{0.6 \times 0.8 \times 0.8} = \frac{1}{6}$$

74)

It is zero order reaction

$x = kt$

$x = 1.2 \times 10^{-2} \times (10 \times 60)$

$x = 7.2$ M

75)

Rate = $k [A] [B] [C]^2$

76) In this reaction : Intermediates ⇒ N_2O_2 and N_2O

77) **Asking :**

Rate law exp.

Concept :

Mechanism of reaction based rate law.

Solution :

Step 1 (fast and rev.)

$$\square \quad K_c = \frac{[A_2B_2]}{[AB]^2}$$

or $[A_2B_2] = K_c [AB]^2$ ....(1)

Step 2 (Slow and R.D.S.)

$R = K' [A_2B_2] [C]$ ....(2)

by 1st and 2nd equation

$R = b K'K_c' [AB]^2 [C]$

$R = K [AB]^2 [C]$

Correction option is : 1

$r = k[AB]^2[C]$

78) $t_{99.9\%} = 3 \times t_{90\%}$

79) $A(g) \rightarrow 2B(g) + C(g)$

a 0 0 ; $a = P_o$

a–x 2x x ; $a + 2x = P_t$

$$x = \frac{P_t - P_o}{2}$$

$$K = \frac{2.303}{t} \log \frac{2P_o}{3P_o - P_t}$$

80)

180

81) Slope of the curve between concentration of product and time (in hour) is K (rate constant) = 0.2 (given)

$\Rightarrow [A]_t = [A]_0 - Kt$

$\Rightarrow [A]^0 = 0.05 + 0.2 \times \frac{30}{60} = 0.15$

82)

Both (1) and (3)

83)

Both Statement-I and Statement-II are true

84)

Explanation

A. The calculation for $t_{1/4}$, the time for 1/4th of a first-order reaction to complete.

Concept

A. For a first-order reaction, the integrated rate law is: $\ln([A]_t) - \ln([A]_0) = -kt$
Where:
$[A]_t$ = concentration of reactant at time t
$[A]_0$ = initial concentration of reactant
k = rate constant
t = time

Calculation

A. When 1/4th of the reaction is complete, 3/4th of the reactant remains. Therefore, $[A]_t = (3/4)[A]_0$.
B. Substituting this into the integrated rate law:
   $\ln((3/4)[A]_0) - \ln([A]_0) = -k \times t_{1/4}$
C. Using logarithm properties:
   $\ln(3/4) + \ln([A]_0) - \ln([A]_0) = -k \times t_{1/4}$
   $\ln(3/4) = -k \times t_{1/4}$

   $t_{1/4} = -\ln(3/4) / k$

A. Since $-\ln(a/b) = \ln(b/a)$, we get: $t_{1/4} = \ln(4/3) / k$
B. Converting natural logarithm to base-10 logarithm: $t_{1/4} = (2.303 / k) \times \log(4/3)$

Answer option 3, $\{t_{1/4} = (2.303 / k) \times \log(4/3)\}$.

85)

$t_{1/2} = 100$ sec

$$K = \frac{0.693}{t_{1/2}}$$

$$K = \frac{0.693}{100} = 6.90 \times 10^{-3}\ s$$

86)

We need to find $A_{87.5\%}$ for 1st order rxn.
Given, $t_{75\%} = t_{3/4} = 2t_{1/2}$
$t_{3/4}$=100min
100min=2×$t_{1/2}$
now,
$t_{87.5\%}=t_{7/8}=3\times t_{1/2}$
= 3 × 50
= 150 min.
Option → (2)

87) **Explanation:-** We find time for a first order reaction to reduce 40g to 10g reaction.
Given data :

$$K = 2.303 \times 10^{-3} s^{-1}, [A]_0 = 40, [A]_t = 10$$

Concept:- $$t = \frac{2.303}{K} \log \frac{[A]_0}{[A]_t}$$

Calculation :- $$t = \frac{2.303}{2.303 \times 10^{-3}} \log \frac{40}{10}$$

$$= \frac{2.303}{2.303 \times 10^{-3}} \log 4 = 10^3 \times \log 4$$

Final answer : 602 S

88) **Question is Asking About:**
Find $[A]_0$ for I^{st} order reaction

Given Data:
$t_{1/2}$ = 2000 years, t = 8000 years,
$[A]_t$ = 0.02 M
Concept :
$t_{1/2} = \frac{0.693}{K}$, find value of K and put $K = \frac{2.303}{t}\log\frac{[A]_0}{[A]_t}$
Solution/Explanation/Calculation:
$K = \frac{0.693}{2000}, \frac{0.693}{2000} = \frac{2.303}{8000}\log\frac{[A]_0}{0.02}$
$1.2 = \log\frac{[A]_0}{0.02} \Rightarrow 10^{1.2} = \frac{[A]_0}{0.02}$
$\Rightarrow 16 \times 0.02 = [A]_0$
Final Answer = 0.32
Hence, option (2) is correct

89)

Adsorption of gas on metal surface at high pressure.

90)

24.1 sec

BIOLOGY

91)

The secretion of LH and FSH decreases gradually during the follicular phase

92)

Negative feed back of progesterone and estrogen

93)

Prostate gland

94)

A → d → ii; B → c → i, C → b → iii, D → a → iv

95)

In oviduct after completion of meiosis-II

96)

Ovarian changes

97)

All of these

98)

Assertion is True but the Reason is False.

99)

NCERT Pg. 46

100) NCERT Pg. # 51

101)

'2n' only

102)

Secondary spermatocyte

103)

Statement 1 is incorrect but statement 2 is correct.

104)

Secondary spermatocyte

105)

Erection, insemination

106)

Both assertion and reason are true and reason is the correct explanation of assertion.

107) • A. Transfer of sperms into the female genital tract: This is the definition of Insemination (iv).

• B. Sperms released from the seminiferous tubules: This refers to the process of Spermiation (iii).

• C. Forceful expulsion of semen from the body of male: This describes Ejaculation (i).

• D. Liberation of sperms from testis: This is the process of Semination (ii).

The correct answer is : (3) A-iv, B-iii, C-i, D-ii

108)

Glans penis is covered by a loose fold of skin called foreskin

109)

Uterus : Fertilization canal.

110)

Uterus

111)

It helps in lubrication of penis

112)

Gametogenesis → Fertilization → Zygote → Parturition

113)

Both Assertion & Reason are False.

114)

NCERT Page No: 43 (XII)

115) NCERT XII Pg. # 27

116)

Both statement I and statement II are false

117) NCERT-XII ; Page No. # 33, 34

118) NCERT ; Page No. # 30

119) NCERT ; Page No. # 29, 30

120)

NCERT Pg. No. # 27 to 38

121) NCERT Page No. # 31

122) NCERT Page No. # 31

123) NCERT P.No. 35

124) NCERT ; Page No. # 32

125) NCERT ; Page No. # 26

126) NCERT Pg. No. # 26

127) NCERT Pg. No. # 27

128)

NCERT Pg # 27

129)

NCERT Pg # 33

130)

Opt.	Hor mone X	Hor mone Y	Stru cture A	Stru cture B	Hor mone W	Hor mone Z
(4)	LH	FSH	Mature follicle	Corpus luteum	Estrogen	Proge-sterone

131)

NCERT-XI, Pg. # 2

132)

NCERT XIth Page No.29,30

133)

NCERT (XI) Pg. # 4

134) NCERT Pg. # 6

135) NCERT-XI, Pg. # 5

136) NCERT Pg. # 9,10

137)

NCERT XI Pg. # 9 (Para 3, line 1,2,3)

138) NCERT-XI, Pg # 11

139)

NCERT Page No. # 7, 9, 10, Table 1.1

140) NCERT, Pg # 7

141)

NCERT Pg. # 9

142)

NCERT XI, Page # 16,21,22,23

143) NCERT (XI) Pg. # 19

144)

NCERT (XI) Pg. # 20

145) NCERT XI, Pg. # 27

146) Euglenoid and green algae both have chlorophyll a and b

147) Spirulina, chlorella, spore of slime mould, potato, albugo

148) NCERT Pg. # 18

149) NCERT Pg. # 23, para 2.3.2

150) NCERT XI Pg.# 20

151) NCERT XI (Old)/(New) Pg. # 81/17

152) NCERT XI (Old) Pg. # 81

153) NCERT XI. # 19

154) NCERT XI # 17,18

155) NCERT-XI, Pg. # 22

156) NCERT Pg. # 19, 20, 21

157)

NCERT-XI Pg. # 23,24

158)

NCERT XI, Pg # 16, 19, 20

159)

NCERT XI, Pg # 20

160)

NCERT XI, Pg # 20 to 21

161)

NCERT XI, Pg # 22

162) NCERT XI, Pg. # 17

163) **Explaining the question :**
The question asks to determine the correctness of both statements and identify the appropriate option.
Concept : This question is based on
Bacterial reproduction and the ecological roles of bacteria
Solution : Bacteria reproduce through various methods, including binary fission, budding, and fragmentation, not mainly by spore formation.
Chemosynthetic bacteria are crucial in nutrient cycling. They convert inorganic compounds into organic matter, playing a significant role in the biogeochemical cycles of elements like nitrogen, phosphorus, iron, and sulfur.

164)

Explaining the question: The question is asking to determine the correctness of both statements
Concept: This question is based on Archaebacteria
Solution:
The assertion is correct because archaebacteria are found in extreme habitats, and the reason is correct because their unique cell wall structures contribute to their ability to survive in these harsh conditions.

165)

NCERT Pg. # 16

166)

NCERT Pg. # 17

167) NCERT Pg. # 16

168) NCERT Pg. # 16, 17, 18

169)

NCERT Pg. # 17, 18

170)

Solution:

The Monera kingdom includes prokaryotic organisms, such as:

A. **Pseudomonas (a bacterium)**

B. **Archaebacteria (a type of archaea)**
Answer :- 1

171) The correct answer is **1. Mycoplasma - Tri-layered cell wall.**
Explanation :
Mycoplasma: These are **bacteria** that **do not have a cell wall** at all, which makes them unique among prokaryotes. They instead have a **flexible plasma membrane**. So, the statement "tri-layered cell wall" is **incorrect**.
Gonyaulax: This is a **dinoflagellate** that causes **red tide** and **water blooms**. This match is **correct**.
Albugo: Albugo is a **fungus** that acts as a **parasite** on plants like **mustard**. This match is **correct**.
Spirulina: Spirulina is a **photosynthetic cyanobacterium**. This match is **correct**.

172) NCERT (XIth) Pg. # 20, 21

173) NCERT (XIth) Pg. # 15

174)

Transduction:
A virus, specifically a bacteriophage, transfers genetic material from one bacterium to another.

The correct answer is: OPTION (2) Transduction

175)

NCERT (XIth) Pg. # 20,21, Para-2.2, 2.2.1,2.3.4
Four (A, B, D, E)

176) NCERT XI Pg. # 23

177)

The number of fungi from the provided list that have septate and branched mycelium with the absence of asexual spores is 1, specifically Agaricus.

The correct answer is: OPTION (3) 1

178)

NCERT Page No. # 20,21

179)

NCERT (XI) Pg. # 24

180)

Assertion and Reason both are true but reason is not correct explanation of Assertion